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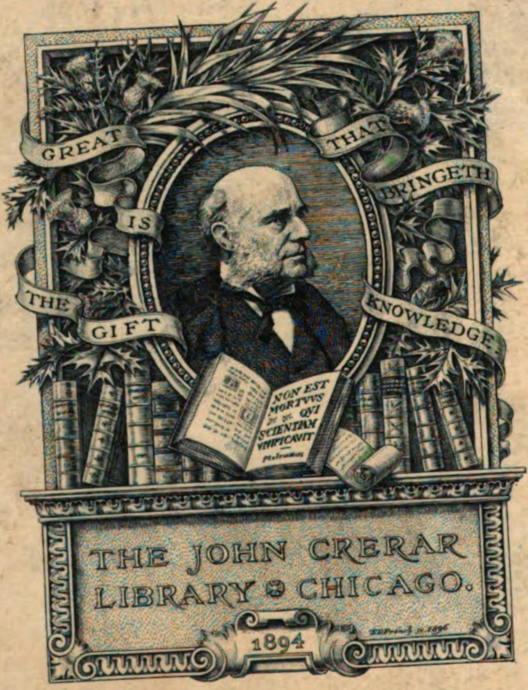
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1894

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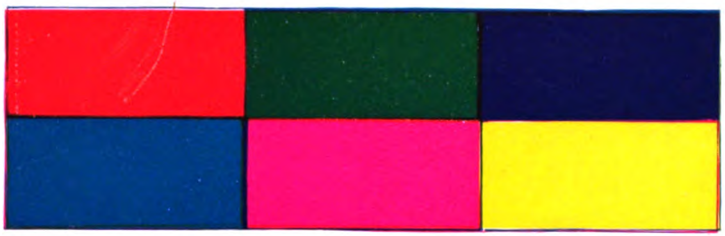


FIG. 1.

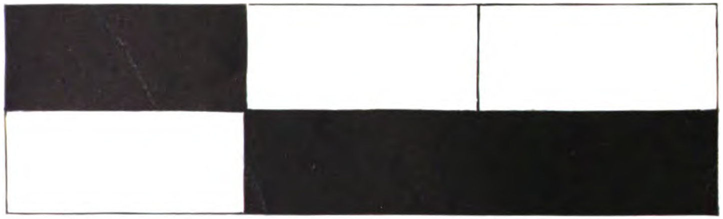


FIG. 2.

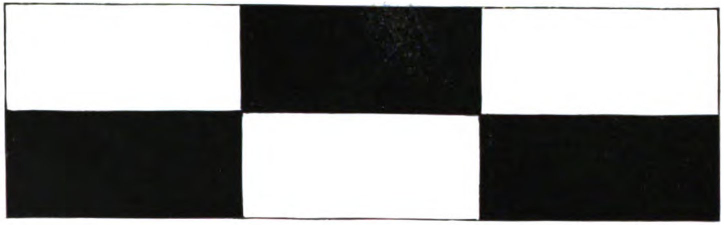


FIG. 3.

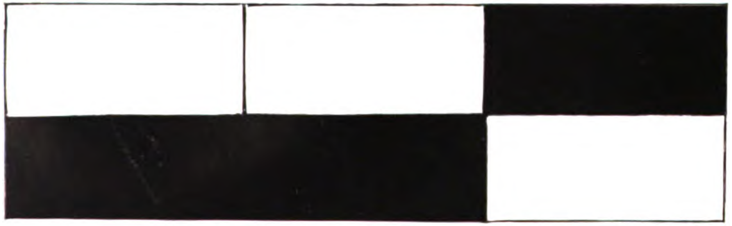


FIG. 4.

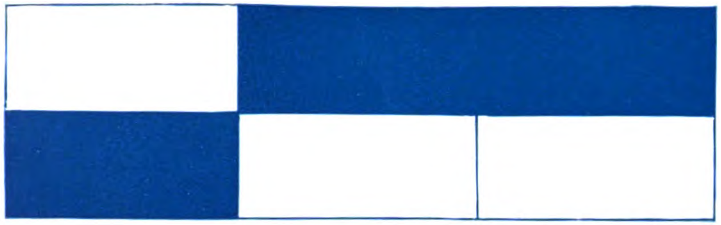


Fig. 5.

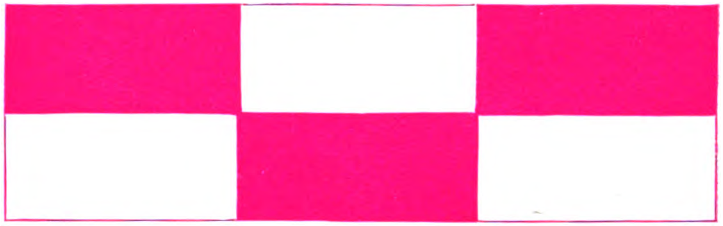


Fig. 6.

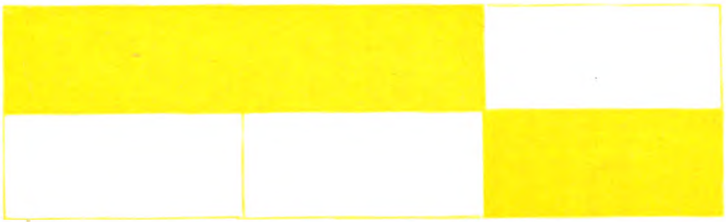


Fig. 7.

Estab. Jan. 1894.
"The Process
Photogram"

THE PROCESS
ENGRAVER'S
MONTHLY
THE PROCESS PHOTOGRAM
ESTABLISHED JAN 1894

VOL. XVI. No. 181.
JANUARY 1909.

Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly.*

Analysis of a Half-Tone Portrait.

Showing responsibilities of block-maker and of printer.

By N. S. Amstutz, in "The Inland Printer."

THE original from which both half-tones are reproductions is a soft brownish-black platinum print with considerable "surface texture" showing in the background, so that it is not an easy subject to reproduce. Fig. 1 is inserted alongside of fig. 2, not for purposes of invidious comparison, but to show clearly what variation in treatment and interpretation has been given to each of the reproductions.

It is impossible to properly appreciate the actual closeness of adherence to a given requirement unless one makes comparisons in the light that one condition may throw on another. The engravings themselves are made the subject of comparison so that the various modifying influences that interpolate themselves between the engravings and their finished prints may to a large degree cancel each other, because the same personal equation is impressed upon each specimen.

When one realises how much misunderstanding and undeserved blame of reliable workmen arise from a combination of circumstances in which no particular blame can attach to any one in the matter of printing half-tones, it becomes an important matter to lay such a groundwork for comparisons, establish certain standards of attainment, etc., as shall make the lot of all craftsmen an easier one, because there will be little or no carping criticism, but there may be a great deal of wholesome analysis of efforts and results that will be productive of far-reaching results.

Photograms or wash-drawings having a deep black background with little gradation in the middle tones when used as copy for half-tone plates may show up well in the engraver's proof. This is because the ink can be placed on the cut with a hand brayer, and the overlays made to bring out deep blacks, middle tones, and "whites" with all the gradation, and sometimes even better gradation than was present in the original copy. After the ink is on the plate the prover can, and frequently does, manipulate the plate by wiping off color here and there after the style of the worker in photogravure, steel die or copperplate printing.

The prover's mind is concentrated on getting a nice proof, and rightfully enough from one point of view, for he has not been awakened to the fact as a general thing that the work he is doing is to set the pace for the man to whom the cut will come for interpretation on the cylinder press. What can be done on the hand press can only be approximated on the cylinder machine. A half-tone cut will not print dead black in the heavy shadows if the half-tone dot is there. The letterpress may carry so much color that the type looks sloppy, yet the half-tone cut is gray and dead. If additional color is carried in a mistaken effort to make the shadows print solidly the entire cut is "mushed."

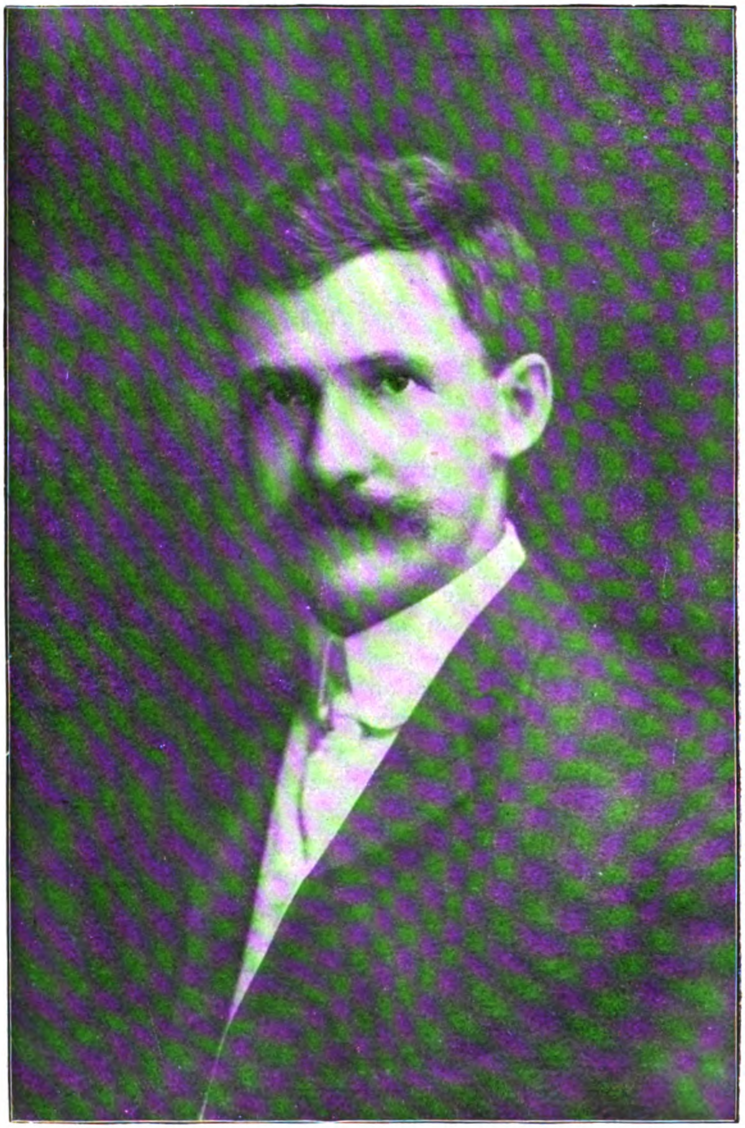


FIG. 1.

The customer who has a job to be printed with illustrations, should, as far as practicable, have all the work done by one house. The printer should be careful to give the engraver advice regarding the character of the paper and ink to be used, and also information of the effect sought to be obtained. The engraver will adapt his work to the paper and presswork. Too often, however, a mixture of old and new cuts from a variety of sources and with a variety of meshes are given the pressman, and it is a very difficult task to reconcile, in the same forme, the treatment an open cut requires with the treatment required by a solid cut. A cut that is made open by the engraver may be proved up to look almost solid by the prover, but the pressman will find it difficult to make this metamorphosis on long runs on the cylinder press without spoiling the job by destroying the balance between the engravings and the type matter.

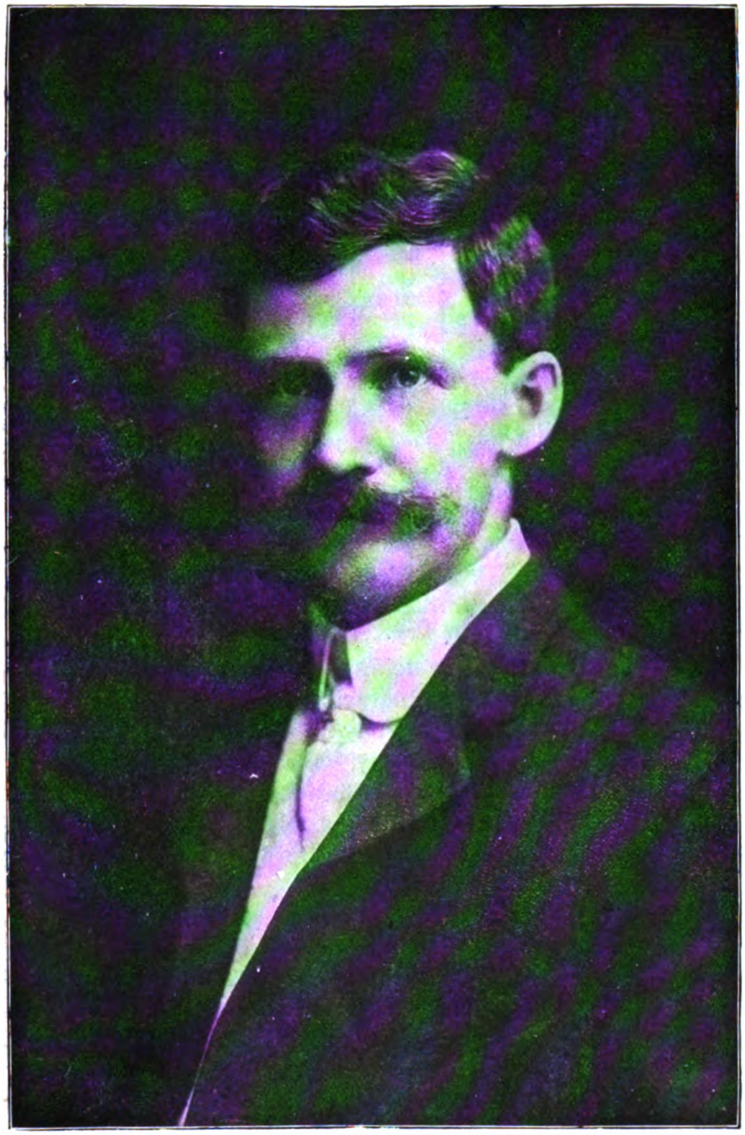


FIG. 2.

The analysis has to do with the screen pitch, unit area, diameter and area of the black and white dots, and the percentage of black and white of four tonal values. The points of observation are noted in the table.

Fig. 1 has 145 lines per inch, a screen pitch of ·0069 inch and a unit area value of 476 (·0000476 sq. in.).

Fig. 2 has 150 lines per inch, a screen pitch of ·00666 and a unit area of 443·5 (·00004435 sq. in.).

The margins of the white dots in the background of fig. 1 are ragged to a large degree, thus throwing the dots and the printing areas surrounding them out of symmetry, which produces a "blotchy" appearance. This is probably caused by too vigorous etching or too much heat when baking the "enamel." Either one would cause ragged edges. On the other hand, a slight excess of heat would partially destroy the acid-resisting properties of the enamel, and thus allow the acid to attack the copper underneath over the

This brings us to the point of making an analysis of the two specimens shown. In order that it may be the more readily understood and the one compared with the other the characteristics are given in Table A, which summarises the values.

TABLE A.—SPECIAL PORTRAIT HALF-TONES. CHARACTERISTICS AT 145 AND 150 LINES PER INCH.

Kinds of Data.	Figure 1.				Figure 2.			
	"Whites."	Back-ground.	Gray.	Shadows.	"Whites."	Back-ground.	Gray.	Shadows.
Form of Dots and where located.	Smallest ● in collar	○ Near ear.	○ Left cheek.	Smallest ○ Right eye.	Smallest ● in collar.	○ Near ear.	○ Left cheek.	Smallest ○ Right eye.
Diameters	·0015″	·0050″	·0060″	·0025″	·0010″	·0035″	·0060″	·0030″
Areas, white	458·3	196·4	282·7	49·1	435·6	96 2	282·7	70·7
„ black	17·7	279·6	193·3	426·9	7·9	347·3	160·8	372·8
Per cent. of white	96·28	41·26	59·35	10·08	98·18	21·69	63·75	15·94
Per cent. of black	3·72	58 74	40·65	89 97	1·82	78·31	36·25	84·06
Unit areas	·0069 × ·0069 = ·0000476 □ in = 476				·00666 × ·00666 = ·00004435 □′ = 443·5			
Lines per inch	145				150			
Screen pitch	$\frac{1}{145}$″ = ·0069 inch				$\frac{1}{150}$″ = ·00666 inch			
Diagonal pitch	/′ ·00975 inch				/′ ·00942 inch			
Areas of pure gray	White 238 and 238 black				White 221·7 and 221·7 black			
Diameter of pure gray dot	·0055				·0053			

whole of the area, but as the plate shows no such action, it is assumed that the defect is due to the lack of adhesion between the enamel and the copper, to prevent the flaking away of enamel particles in the acid immediately adjacent to the edges of the dots, thus leaving a ragged margin.

It will be noted from the table that the tonal value of fig. 1 in the background is quite abnormal. This is apparent at a glance by comparison of one print with the other, but what the *specific value* of such aberration is cannot be told in this manner, by offhand visual inspection, hence the desirability of scientific analysis.

When attention is called to certain features, *definite* values should be ascribed to the same. Tonal value should be referred to as diameter or area of dot, or percentage of white. The latter would be preferable, as it is easy to make up a table showing such percentage values for various screens and diameters of dots, giving *unit areas* as well. Black percentages are easily found by simply subtracting the percentage of white from 100.

By doing things along these lines, process engraving will be placed on the proper scientific plane, and the day of uncertainty, when the sentiment of the skit on indefiniteness, "As long as a piece of string and as big as a lump of chalk," was the rule, will have passed into oblivion.

The differences of the two engravings are clearly pointed out in Table B, which is self-explanatory. The areas for both the black and white values are given in Table A so as to more clearly show wherefrom the percentages are derived.

Taking the white area of the first column as 458·3 and remembering that the unit area for fig. 1 is 476, the proportion of *white* contained in unit area (which is *altogether white*) is expressed as $\frac{458{\cdot}3}{476}$, and the amount of black, due to the smallest black dots, as $\frac{17{\cdot}7}{476}$ or 3·72 per cent.

TABLE B.—SPECIAL PORTRAIT HALF-TONES. PERCENTAGE CHARACTERISTICS AT 145 AND 150 LINES PER INCH.

	“Whites.”		Background.		Grays.		Shadows.	
Per cent. of white, fig. 1	96·28	...	41·26	...	59·35	...	10·03	...
,, ,, fig. 2	...	98·18	...	21·69	...	63·75	...	15·94
,, black, fig. 1	3·72	...	58·74	...	40·65	...	89·97	...
,, ,, fig. 2	...	1·82	...	78·31	...	36·25	...	84·06
	100	100	100	100	100	100	100	100

In Table B the background of fig. 1 is shown to possess almost twice as much white as fig. 2, and in the “whites,” fig. 1 has approximately one-half the white value of fig. 2. The brilliancy of fig. 1 is seen to be very much below that of fig. 2.

To properly consider the value of either engraving from the basis of interpretation, it is absolutely necessary to know the tonal values of the original photograph. This should be given numerically for the quarter, half- and three-quarter tones.

Having such a record it becomes easy to know from a table giving the sizes of dots, areas and percentages, whether the interpretation is a faithful one or is but an approximation.

A reproduction may be faithful enough as to recognisability, but it may at the same time lack all of the subtle charm of true tonal values that differentiate an approximation from a true copy.

If unit area is taken as 476, whole or pure white will be represented by this number; ¾ white by 357; ½ white by 238; ¼ white by 119; ⅛ white by 59·5, and no white by dead black that covers *all* of a unit square or unit area.

The dot diameters for these areas work out correctly until the point of 25 per cent. of black (75 per cent. white) is reached. At or near this point the dividing space between two contiguous depressions (white dots) is etched away and the law of periodic acceleration comes into play to modify the etching rate and also the interpretation. If unit area is taken and the *diameter* of a dot is calculated therefrom which shall have the *same* area, it will be found when four such dots are placed with their centres coincident with the corners of a square, whose sides are equal to the screen pitch, that there will remain an uncovered area in the centre of the square, even though the dot and unit area is exactly the same. In order to cover this area the dot diameter must be *increased* so as to be the same as the diagonal pitch. The reason for this tonal aberration is found in the fact that dots of such an area and diameter as to equal unit area, when their centres fall on the corners of a unit area square, have their circumferences *overlap* at the sides of the square.

These deductions are based on *round* white and black dots. The “four crescent” dots beyond the “three-quarter” whites are amenable to a separate law.

Freys' Sand-blasting Process.

Johann Heinrich and Ernest Frey, of Schaffhausen, claim a patent for a process "whereby pictures may be transferred photographically for sand-blast resist purposes.

"Sensitive paper, which in itself appears theoretically suitable for carrying out such a process, has in practice proved unsuitable, owing to being a too indirect method, and also owing to its entailing many difficulties, and above all because it has been found to be impossible to effect a good adhesion between the glass or the like plate and the paper, which is applied thereto after being photographically exposed.

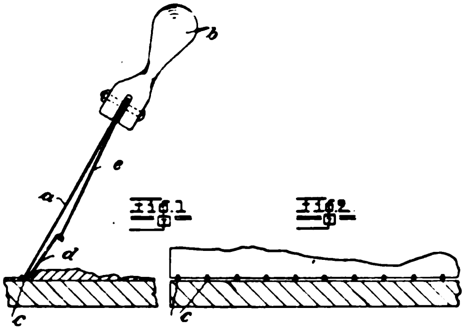
"The present process is based on applying initially, *i.e.* before exposure, a substance, sensitive to light, to the glass or stone plate, and subsequently exposing the same.

"A suitable substance for forming the sensitive film is a specially compounded chromated gelatine. There are difficulties in applying such a mass to the surface of a plate as a film of the necessarily uniform thinness throughout, because if the gelatine be poured on to the surface in a fluid condition, the plate must be previously exactly levelled, which operation it is impossible to effect if the surface be not truly plane; and further, such a fluid mass will, after drying, not possess the requisite tenacity to withstand the sand-blast. Also the drying and setting would be too slow. On the other hand, it has hitherto been impossible to pour a thick solution so as to form the requisitely thin film, even with the aid of a centrifugal machine [whirler], as such a mass is too viscid to run freely.

"If the film be thicker in one place the light cannot fully penetrate at that situation.

"These defects are avoided by the present process in the following simple manner:—

"At the edges of the plate, strips are provided so that they project above the surface about 1 mm., or an amount equal to the required depth of the gelatine film. After the plate has been levelled as well as possible, the gelatine is poured out in a viscid condition, whereupon by means of a lath which is drawn over the surface, sliding along the strips, the excess of the gelatine is wiped off. The remaining thin film is then of uniform thickness, and remains adherent to the plate without flowing, and quickly sets. Should the surface of the plate be uneven, or even be curved, for instance, like some window or stained glass, instead of employing a lath, a special tool is used.



"The drawing shows two views of this tool, fig. 1 being a side elevation, and fig. 2 a front elevation.

"The tool consists of a very thin flexible steel blade *a*, corresponding in breadth with the breadth of the plate, secured in a handle *p*, and provided along its lower edge with a number of projecting teeth *c* arranged at intervals apart. The latter are preferably formed by thin nickel wires *d*, which, as shown in the drawing, are bent so as to embrace the lower edge of the blade *a*, and are secured to another plate *e*, or the like.

"On wiping the surface of a plate which has been covered unequally with a thick film of gelatine with this tool, the steel blade follows with its teeth all inequalities of the surface of such plate, and leaves a uniformly thick film of gelatine at all parts of the surface, the thickness of the film corresponding to the length of the teeth. The narrow furrows made in the gelatine by the teeth on passage of the tool immediately close behind them. A film formed in this manner will not flow off even greatly curved surfaces, in view of its adhesion, but dries quickly in a uniform depth on the surface of the plate.

"A suitable composition of gelatine is as follows:—100 gr. of best quality white gelatine dissolved in—500 c.cm. of boiled and filtered water; 30 gr. of white sugar; 30 c.cm. of clarified glycerine.

"This solution, after being heated to 50° C., is mixed with 3 to 5 gr. ammonium bichromate, with the addition of 3 to 5 c.cm. of caustic ammonia.

"The quantity of ammonium bichromate added must not depart appreciably from the amount set forth; because if more be added the gelatine assumes a yellow tint which would obstruct the necessary penetration of the light to the base of the film, and, if less, on exposure to light, the gelatine would not be sufficiently hardened, so that when subsequently treated with hot water it would wash off.

"Assuming the picture on an ordinary photographic plate is to be transferred to the gelatine, the exposure is effected in the usual manner. Preferably a photographic plate produced by the wet collodion process is employed. This is laid on the gelatine film. The whole is then exposed to the light of an actinic arc lamp or to sunlight, and afterwards developed in hot water, whereupon the portions not acted upon by the light dissolve right down to the base and expose the glass plate. The picture appears in intaglio or in relief in accordance with whether a negative or positive photographic plate has been employed.

"The gelatine-covered plate so treated cannot be acted upon by the sand-blast for effecting the engraving of the picture immediately after drying, as the remaining gelatine, by reason of its hardness and brittleness, would offer sufficient resistance to the sand for a short time only, and consequently the engraving would not be very deep, and could not be effectually carried out. In order to effect this properly, it is necessary for the plate to undergo a further treatment, which forms a further portion of our invention, and which consists in the immersion of the dried gelatine picture in a solution composed of one part of gum solution of 1 : 3, two parts of glycerine (or sugar), in three parts of water, in which the plate remains for half an hour. After the plate has been washed under a rose and has been dried, the gelatine film has become tough and elastic like Para indiarubber, so that it can be exposed to the action of the sand-blast for as long a period as desired, without being destroyed; and further, it adheres well to its plate.

"Not only should it be possible to transfer pictures from photographic plates to the plates to be engraved, but also handmade drawings and letterpress must be capable of being transferred by the present process. It has been found that none of the inks hitherto used for printing or drawing, even the best black ink, is sufficiently opaque. With all such, produced by known means, when exposed to electric light, the violet and ultra-violet rays penetrate the ink, and a sharply defined gelatine relief is not obtainable.

"According to the present invention, for the characters or the drawings, so-called light-filter inks are employed, *i.e.* inks which, when applied in a thick layer, have the property of absorbing all chemically active rays. These inks, which are preferably composed of two parts of glycerine and three parts of gum-arabic, completely saturated with an alcoholic solution of a suitable aniline color, such as aurantia or spirituous orange-red, cannot, however, be used with ordinary transparent tracing papers, as these latter will not absorb the ink. According to the present invention, this difficulty is overcome by using tissue paper which will absorb the ink to a great depth without spreading, and which has further properties rendering it suitable for use with the process. As, however, tissue paper is not transparent, it is best made transparent for the present process by grape sugar. Tissue paper rendered transparent by grape sugar and provided with an impression, has the useful property that when applied to the plate in a moist condition and pressed by means of a roller it adheres in an air-tight manner thereto, a sharp copy consequently resulting.

"In order to render the process capable of universal application, it is necessary that from positive drawings or impressions negatives should be capable of being directly produced, and *vice versa*, so that such prints can be employed instead of the originals. This is effected by the present invention as follows:—

"The drawing or impression is traced with a light blue gum-printing ink, dusted over with dextrine and dried. After being dried the paper is stretched in a frame. By means of a spraying device, an alcoholic solution of shellac, saturated with an aniline color, such as aurantia or spirituous red, is then uniformly applied, this taking but little time, about half a minute for 1 sq. cm. After a lapse of a quarter of an hour, the tracing can be developed in ordinary water. As soon as the water has penetrated from the back to the gum and dextrine, these substances swell and burst the shellac layer and float off, together with the superposed layer of color. At those portions not covered by gum, the shellac adheres well and even enters into the tracing paper on venetian turpentine being added, so that such tracings likewise form light filters. All good transparent commercial tracing papers can be used for making these tracings.

"For greater security or strength the tissue paper impressions, and likewise the shellac prints, can be treated with bronze powder whilst still damp.

"The further operation by means of the sand blast on the plates provided with the gelatine relief, is effected in the usual manner, and can be continued so as to effect the engraving to the desired depth. The resulting engravings are sharper and clearer than those of plates which have, as hitherto, been transferred mechanically. Pictures can be transferred by the present process with a great economy of time and labor as compared with previous processes."

The Winstanley Half-tone Process.

By Edmund Passingham.

In the 1905 volume, page 26, of *The Photogram*, appears the following article:—

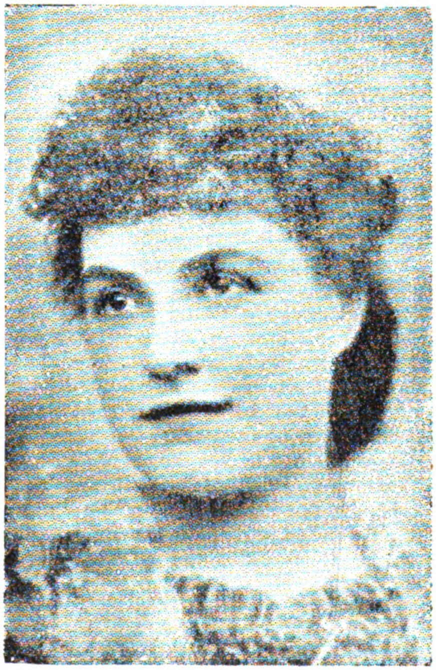
"A writer in a photographic contemporary recently delivered himself as follows: Of all crank ideas for producing screens, one of the most remarkable I have ever heard of was the locking up, as a printer locks up type, of some thousands of needles, the upstanding points being ground flat, inked, and an impression taken from the same. Unfortunately, the author of this ingenious notion did not live to make use of his invention."

The accompanying experimental illustration made by the writer of the present notes shows that the said notion was not such a cranky one as the author of the above would have us believe.

The following is from the same page of *The Photogram*:—

To anyone who knew David Winstanley, F.R.A.S., a man who was a martyr to his inventive genius, if ever such existed, an ingenious investigator, competent chemist, and careful writer, who died practically of starvation because he gave his results to the world instead of making a business out of them, such a description of his process must seem somewhat unjust. If the statement were correct, we should not attempt to defend Winstanley's memory, but it is one of those half-truths which are worse than a positive mis-statement. Winstanley's process is not one for producing screens, but one for producing a block which on a definite and practical theory would give pure whites, pure blacks, and every gradation between, if such appeared in the negative. His process was patented in 1866, and the following outline description, contributed by its inventor to *The Photographer's World* in 1877, will be interesting to our readers:—

"If we take a pin or other pointed rod, and introduce it vertically and point downwards into an indentation in a horizontal plate, we shall find, if the point be not too short, that that particular portion of it which is on a level with the general surface of the indented plate has a diameter determined by the depth of the indentation into which it has been introduced. If the indentation be but 'slight,' the portion of the point on a level with the general surface will be near its apex; and, on the other hand, if the indentation be 'considerable,' it will be near its base. This fact forms the basis of my process of photo-mechanical printing invented twenty-one years ago. The process itself is this:—A suitable frame of metal is filled by a considerable



[This block is perhaps the most costly the world has ever produced. It is the only result of the working of a process, perfect in theory (much better, in fact, than the half-tone process), which cost the life of its inventor and occupied the whole time, for some three years, of Mr. Edmund Passingham, who writes the accompanying article. Mr. Passingham was supported by the capital of a great business house, and his experiments, with machinery, patents, etc., cost some thousands; for which the above block is the sole return. It is one of the tragedies of the "process" world. The Winstanley process, which cost so much, and which *may yet* be very valuable to the craft, is given fully and freely to them, in this and the succeeding issues of *The P.E.M.*—Ed.]

number of uniformly pointed wires, and is placed (points down, of course) upon a metallic intaglio similar to those used in Woodburytype. The wires which had previously been bound are loosened and allowed to adjust themselves to the uneven surface which lies below, the process being assisted by vibration. They are then rebound, and the result is the reverse in points of the undulating surface of the intaglio, the deepest shadows of which (corresponding with the shadows of the picture) are in this pointed surface those portions which are most raised. The picture of undulating points is then carefully ground until the lowest points are barely reached, the grinding being, of course, conducted in such a way as to produce a surface which is plane. This plane is a left-handed copy of the picture we desire to reproduce, but is made up of dots distributed in equal numbers over equal areas, *but increasing in magnitude directly as the shades and shadows of our picture increase in depth*; and from it right-handed copies of the original picture may then be produced in such an ink and at such a press as has been employed in printing the present page. Of course, in practice, the points themselves would not be ground, but only the facsimiles of their surface made by stereotyping operations. I also devised another method which I need not dwell on now, by which the picture is obtained in dots, equal in size, but differing in number in proportion to the qualities of light and shade.

"The readers of *The Photographer's World* will wonder, as writers in sundry photographic journals have already wondered, how it comes to pass that a process so clear and definite in theory should not be in commercial use, nor have been so during the twenty-one years which have elapsed since it was invented or devised. The explanation is a simple one. I could not find out amongst the Sheffield pin-makers any who could make the kind of points which I required, and make them all alike. The patent was accordingly allowed to lapse. The remedy for my difficulty, however, is 'easy when you only know the way.' Type-makers, and not pin-makers, are the men who manufacture rods terminating in pyramids or cones having the uniformity required. The 'Winstanley Process' has been public property these eighteen years, and I now give the public this, the all-important 'wrinkle' too, and shall be glad to hear of anyone taking the matter up, and arriving at success therewith in a commercial way."

Even if Professor Winstanley had been able to obtain the needles, at Sheffield or any other place, he could little have imagined the difficulties that would have confronted him before he could have made a successful block. I took up the invention in 1895, when the half-tone process with the cross-line screen was not understood very well; when it was scarcely used at all for newspaper work, and when it seemed as if there would be a good opening for Winstanley blocks, for printing on cheap papers. It required nearly three years of continuous hard work before, to the best of my belief, I had mastered the process. By that time the present screen process left little to be desired. I then got much disheartened, and from want of means really could not start manufacturing a fresh set of needles.

Though the process has no present useful application, I am not sure that it may not yet prove valuable for rough-paper printing; so that my experiences may interest the craft.

(*To be continued.*)

LINO-CUTS.—The method of making tint-blocks, poster cuts, etc., by cutting from linoleum has been discussed fully in a recent issue of the *Deutscher Buch- und Stein-drucker*, which suggests that the process might be made much more valuable by the introduction of a special linoleum with a better-woven backing canvas and with simple means of rendering the surface more durable after cutting. It suggests the use of an oil-insoluble varnish for mounting the cuts on wood; and the rubbing down of the back of the lino with sandpaper, to remove the paint and expose the canvas basis, which gives a good hold for the varnish-mountant.

A British-built Router.

Some time ago we spoke of the pride taken by the well known firm of R. Hoe & Co. in working out the details of their machines so as to meet the most exacting requirements of the trade, and mentioned the fact that the whole of their machinery is made at their London works in Borough Road under the supervision of a trained staff of designers and experts. We have recently had the pleasure of examining and operating one of their flat routers which has a number of new features to enable a large quantity of work to be executed in the shortest possible time, and with the least exertion on the part of the operator. Special attention has been given to the spindle, which is made of the finest material and runs in bearings of antifriction metal. Although the cutter runs at a very high rate of speed, the bearings are quite cool, even after a continuous run of several hours' duration. No Hoe router head is allowed to leave the department in which it is manufactured until it has been thoroughly tested and will run continuously without heating.

There is a misunderstanding amongst some of the users of routers on the question of speed. Many seem to think that it is much easier to build a low-speed than a high-speed router, but as a matter of fact a router runs better and sweeter at its highest speed than at (say) half that speed. The tool works more easily and more evenly, and there is less tendency of the machine and the work to shake and jar. In constructing a router, therefore, it is necessary to make one which will run steady and without vibration at any speed, and the principal modifications of the Hoe machine, though many of them have been very small (and even invisible to the worker unless he takes the machine to pieces) have been in the direction of simplification and consolidation to increase steadiness. Everything that could be done to bring the driving power close to, and into direct contact with, the work, has been done, and it will be seen that the latest pattern (fig. 2) fitted with motor and rheostat for starting, has reduced the driving shafts and belts to the smallest possible lengths. The motor, which was formerly placed on the floor, is now on a bracket immediately under the table of the machine, and even this little alteration has made a material improvement in steadiness, and does away with the objectionable vibration which is often met with in machines of this class. The head, which formerly was of brass, is now made of

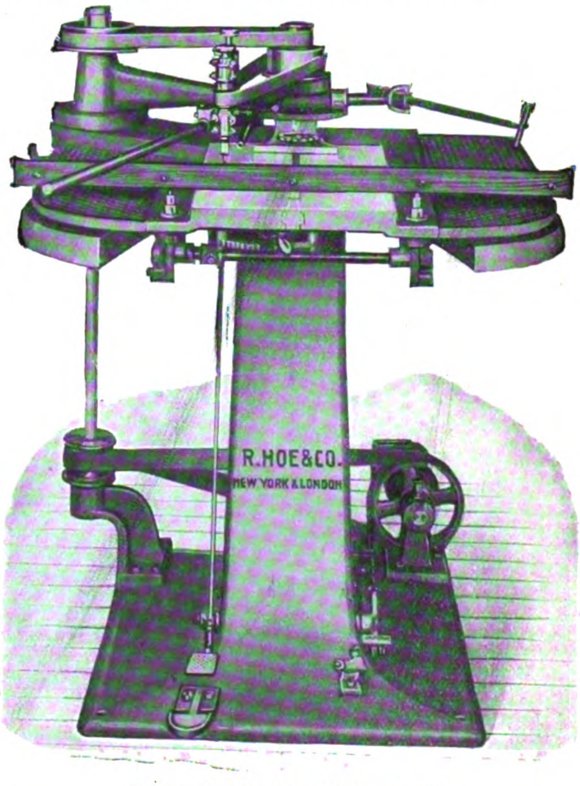


Fig. 1.—Hoe Router. Belt-drive pattern.

aluminium lined with antifriction metal, and this use of aluminium is found very satisfactory, since it combines great lightness with all the toughness necessary for the purpose. The head and its swing arms are built low down very close to the work. The adjustment of the head is not altered in any way when changing cutters or belt, or when regulating the depth of cut. The top of the router measures 39 x 40 inches. The central portion of it, upon which the work is held, is 14 inches wide by 20 inches long, and it is raised above the level of the lattice-work extensions so that the chips which are blown away from the work by a blower, contained within the pulley, drop through the table out of the way. As a minor detail, one may mention the little tool drawers under the front corners of the table, which are convenient for holding spare cutters, oil-can, etc. The guide-rod which supports the handle-bar is raised and lowered by means of a treadle, but there is also a spring arrangement whereby the tool is instantly lifted out of the work if the guiding hand is removed from the handle-bar. While changes have been in the direction of consolidation to steady the work of the router, there has also been an increase in the size and weight of the pedestal on which it stands, so that if the machine is only firmly planted it can undertake anything that need be offered to a router.

Amongst the other details recently modified and improved may be mentioned the plate clamp or grip, which has a double spring action that is very easy and efficient. The rear clamp is brought up to the work by hand and tightened in position by a hand wheel. Then a simple hand lever is pressed over and the front clamp grips the work instantly and firmly. The spring action prevents too much pressure being applied, and there is therefore no danger of buckling the plate. The rear clamp need never be changed so long as plates of nearly the same width are being routed. The illustrations give some details of the machine, but, as has already been stated, its claims are based on simplicity rather than upon complexity, and upon very small modifications in the shapes and proportions of the hidden working parts, which cannot well be illustrated.

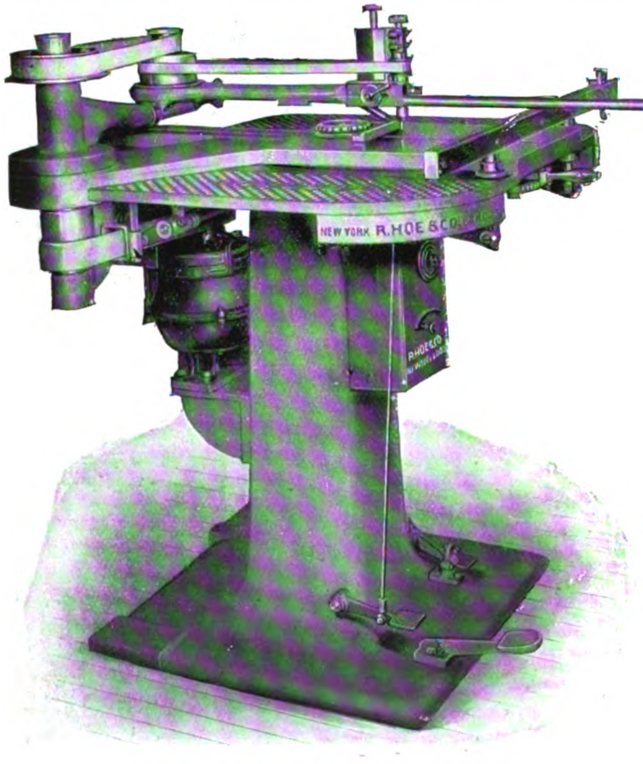


FIG. 2.—Hoe Router. Driven by electro motor.

Cost and Selling Price: A Comment on the Articles by Mr. Arthur Cox.

To the Editor, "The Process Engraver's Monthly."

DEAR SIR,—I have read with interest the articles on cost by Mr. Arthur Cox in the *Process Engraver's Monthly*, and note that the article is concluded in the November issue.

Mr. Cox is entitled to full credit for his effort to enlighten the photo-engravers as to the cost of their output, but it seems to me that he has not grasped the idea that it is possible to ascertain the cost of a half-tone or a zinc-etching of any size, and that there is a varying cost per square inch that is away above the average square inch cost on small cuts and away below the average square inch cost on large cuts. Mr. Cox explains how to arrive at the square inch cost and the average cut cost. This information is all that is needed to arrive at an average cost of a cut of any size, and although I promised you I would not write anything more on this subject, I am impelled to one more effort to explain my theory to the photo-engravers.

For the purpose of satisfying ourselves as to what it costs to make half-tones of any size, let us suppose we have before us 1000 cuts ranging in size from 1 x 1 to 8 x 10, with a total of 15,000 square inches in the 1000 cuts. We will next assume that the records show that the shop cost of making this lot of cuts has been $1500, an average of $1.50 for each cut, and 10 cents for each square inch.

Now, looking at the pile of cuts, we will ask ourselves how much longer it took to photograph, strip, print and flat-etch the largest cut than the smallest cut. Take this smallest cut, a 2½ x 4—how many such separate negatives can a photographer make in a full day? Let us say twenty such negatives, or 200 square inches, is a good day's work for the photographer. Next, this largest cut, an 8 x 10 —how many such separate negatives can a photographer make in a full day? Let us say ten such negatives, or 800 square inches, are also a good day's work for the same photographer. If we admit that there is a possible variation of 600 square inches in the work of the photographer for no other reason than that the size of the negatives vary, then we must admit that the labor cost of making 2½ x 4 negatives is four times as great per square inch as the labor cost of making 8 x 10 negatives.

Now let us consider material. It seems reasonable that as all material is bought in bulk at a price per pound, the cost can be reduced to a certain amount per square inch, and it could be if all the material needed in the handling was also in the finished product, but this is not the case. There is a waste of chemicals and of copper, and the waste is greater in a small cut. Allowing a half inch all round a 10-inch cut, we have 50 per cent. waste, and allowing a half inch all around an 8 by 10-inch cut, we have but 25 per cent. waste.

We know that the work of the electric light and the etching solution are automatic, and that the time of exposure in the camera, in making the print, and in etching, is practically the same for a large or a small subject. We likewise know that there are portions of the work in which the time does vary with the size, although not in proportion to the size. We know that the manipulations in the dark room take more time than the exposure in the camera. We also know that to develop a small negative from a poor copy sometimes takes more time than to develop a large negative from a good copy, and we know that by reason of the detail in a small subject, to stop-out for re-etching, will take more time than to stop-out a much larger subject with no small detail.

You will understand this argument does not apply to vignetting or cut-outs, as such work is, or should be, covered by an extra charge.

Being practical at the business, we know that the time taken in washing glass, coating negatives, exposure, developing, stripping, printing, flat-etching, stopping-out, re-etching, spotting, bevelling, blocking, and proofing, does not in a single instance vary in exact proportion to the size of the subjects. We know that adding to or taking off a quarter or a half inch all around a cut does not increase or decrease the time taken in the several operations of its production.

Knowing this to be a fact, can we devise a plan for computing the cost of any cut in this lot of 1000 cuts, aggregating 15,000 square inches, which have cost us $1500 — $1.50 each and 10 cents per square inch?

It is so obvious that a 1-inch cut did not cost as much to make as an 80-inch cut that no argument is needed to prove it. It is likewise clear that a 1-inch cut must have cost more than ten cents, and it should be just as plain that an 80-inch cut could not possibly cost $8 if the average cost is $1.50.

Even the customer who buys our product and attempts to make our prices will admit, without argument, that if an average cut costs $1.50, a small cut must cost less and a large cut must cost more than $1.50. But about the square inch cost. Can you believe that because the average cost is exactly 10 cents, a 10-inch cut costs exactly $1, and an 80-inch cut costs exactly $8? If you have thought so, consider that a good day's work for one camera is twenty 2½ x 4 negatives. This means that 200 square inches at 10 cents per square inch will cost exactly $20. The same camera can turn out ten 8 by 10 negatives, and the same crew of men will produce the cuts from the negatives. This means that 800 square inches at 10 cents per square inch will cost exactly $80, and what becomes of the $60 difference in the cost of the two days' work? The difference of 600 inches of material cannot possibly cost over $15, and we then have $45 to account for. Does this not prove that the square-inch cost of small cuts is very much greater than the square-inch cost of large cuts?

Now then, what logical and consistent basis can we devise to determine the cost of a cut of any size? We have the average cost in two ways: the cost per cut and the cost per square inch. We have always known that small cuts cost less than large cuts, and we now know that large cuts cost less per square inch than small cuts.

We have an average size of 15 square inches, yet it is not likely there is one cut in the lot that is exactly 15 square inches.

We have an average cost of $1.50, yet it is not likely that there is one cut in the lot that cost exactly $1.50.

We have an average cost of 10 cents per square inch, yet it is not likely there is one cut in the lot that cost exactly 10 cents per square inch.

Average of size, cut cost, and square inch cost have been accepted as facts; but they are only averages, they are not facts.

Individual cost tickets will come nearer to the exact cost, but do not solve the problem of cost, as no two cuts of the same size will cost exactly the same amount.

The average cut cost may seem to be less accurate than the average square inch cost, but the one is no more right than the other. It is obvious that the average cut cost is decidedly wrong on large cuts, and it should be equally obvious that the square inch cost is away off on small cuts.

By combining the average cut cost with the average square inch cost we equalise the inaccuracy of both, and have a basis of cost as nearly accurate as can be devised.

Is it not reasonable that if we combine the average cost per cut and the cost per square inch we will have *double* the cost of a cut of any size, and the actual cost will be one-half this amount? For instance, take a 30-inch cut that our records show has cost 10 cents (5d.) per square inch or $3 (12s. 6d.). To this we add the average cost of $1.50 (6s. 3d.), and we have $4.50 (18s. 9d.) as double the cost of a 30-inch cut and one-half that amount or $2.25 (9s. 4½d.), which is 7½ cents (3¾d.) per square inch, as the actual (shop) cost.

Following this plan, the cost of any cut is one-half the square inch cost and one-half the average cut cost.

What better plan can be offered to find the cost of your product, and what better plan can be devised for pricing your product, than a sliding scale of prices based on a fixed charge of $1.50 (6s. 3d.) to cover labor and other fixed expenses, *plus* a square inch charge of 10 cents (5d.) to cover material and other varying costs?

Someone has said that the sliding scale theory is all right, but that it should have been started years ago when the price for minimum cuts was about what we now know would be a right price, but that it is now too late as the change is too radical, that the customer has been educated to the square inch rate and the cheap minimum, and is more willing to permit us to make the excess profit on large cuts than to accept a reduction on large cuts and stand for the increased price on small cuts.

To analyse this theory, let us assume that twenty years ago someone had taken note of the fact that there was a great difference in the cost of making half-tones of the different sizes, and had attempted to devise a sliding scale that would give an equal return on every day's work and every dollar of expense, regardless of the size of the cuts produced. Perhaps some of us will remember that 50 cents (2s. 1d.) per square inch and a five dollar (£1 0s. 10d.) minimum was at that time the prevailing price. Next, let us assume that the workmen in those days were just as capable, and could produce the same number of negatives and cuts that the men are turning out to-day. We will say that twenty minimum cuts were a good day's output per camera operated, and that ten 8 x 10 cuts were likewise a good day's output per camera.

Admitting that twenty minimum cuts at $5 each, or $100 per day per camera, was a satisfactory income in those days. Then the charge for ten 8 x 10 cuts would have been set at $100 *plus* the cost of the extra material, say $20 extra, or $120 for 800 square inches of 8 x 10's, which would have made the selling price for 8 x 10's 15 cents. (7½d.) per square inch as against $5 (£1 0s. 10d.) each or 50 cents (2s. 1d.) per square inch for minimums or 10-inch cuts.

To construct a sliding scale to govern the price for intermediate sizes, we should have based the price on a fixed charge of $4 (16s. 8d.) *plus* 10 cents (5d.) per square inch, to obtain $5 (£1 0s. 10d.) for a 10-inch cut, and $12 (£2 10s.) for an 8 x 10 cut.

The average cost of operating a plant is about $25 (£5 4s. 2d.) per camera per day, and it was probably about the same figure in 1888. To have sold twenty minimums at $5 (£1 0s. 10d.) each and ten 8 x 10's at $12 (£2 10s.) each would have made the returns as satisfactory on small cuts as on large cuts; but while we have seen the price come down from 50 cents (2s. 1d.) to 15 cents (7½d.) and even lower, and we know that the reason is that there was too much money in the business to maintain the prices, yet we can believe that had it been proposed to establish a price of 10 cents (5d.) per square inch *plus* $4 (16s. 8d.) in those days, the proposer would have met with the same opposition we are having to-day. Looking back, who can say that it would not have been a wise move for the future of the business? We can all appreciate that the better time to have adopted the sliding scale was when there was a fair profit on minimum cuts.

The theory of a sliding scale is so obviously correct that the only argument that can be offered against it is the square inch habit and the visionary profit in the supposedly considerable number of large cuts that we think we have orders for; and yet the records show that 90 per cent. of all the half-tones made are less than 30 square inches.

It will require no straining of the imagination to appreciate that had a scale based on 10 cents (5d.) *plus* $4 (16s. 8d.) been adopted twenty years ago, by this time the discount would be great enough to cut out all excessive profit, and it is my firm belief that the scale I advocate provides for as much profit as there would be in the business if a scale as suggested had been in use these twenty years.—Yours, in the interests of the craft,

GEORGE H. BENEDICT.

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Inks for Tri-color Printing.

WE have received the following advance proof of a leaflet shortly to be issued by Wratten & Wainwright, Ltd., and reproduce it by permission of the firm:—

All those who have any practical acquaintance with reproduction in color by means of the three-color process are agreed that simple as is the method and great as are the advantages, still completely mechanical reproduction is not yet possible, and that a greater or less amount of handwork ("fine-etching") in the case of blocks is necessary.

Some workers appear to think that this being so, the amount of this handwork is a matter of no importance, and that methods of work which lessen it are rather to be deprecated than encouraged. But there are two great objections to handwork. In the first place, it is always dangerous as regards the *truth* of the reproduction. In scientific work, for instance, fine-etching is so very dangerous that it is almost necessary to avoid it altogether. In the second place, it is very expensive. The growing competition in tri-color work, with the concomitant lowering of the price which can be obtained, demands a lessened cost of production. This lessened cost can sometimes, but not always, be obtained at the expense of the quality of the work, but it is undoubtedly better to obtain it by the use of more economical methods of production while still securing the best results.

We firmly believe that by using the right materials in the proper manner, costs of production could be so much diminished as to leave the producer a satisfactory profit in spite of lower prices, which at the same time are practically certain to lead to a largely increased demand.

Those who are acquainted with the results obtained in color photography by the use of screen plates such as the autochrome plates, or the even more excellent results obtained by three-color projection, will scarcely doubt that the theoretical basis of tri-color work is sound, and that the defects of reproduction work must be either in the methods or materials peculiar to that work.

Let us first clearly realise the general method followed in tri-color work. The three-color process is based on the fact that three colored lights suitably chosen, either alone or mixed in various proportions, can reproduce any color.

To reproduce any original we make first three negatives through color filters upon suitable plates, sensitive to the light passing through those filters. These filters are red, green, and blue-violet. Each filter represents about one-third of the composition of white light, and if the light passing through the three filters be mixed together we shall get white light.

Since each of the three filters represents a third of white light, it is clear that a mixture of the light passed by the other two filters will therefore be what is known as *complementary* to it. Thus :—

White light consists of red + green + blue.

The complementary to red is green + blue.

The complementary to green is red + blue.

The complementary to blue is red + green.

The colors of such lights are shown in the chart printed as frontispiece.

It will be seen that green + blue is a light blue, red + blue is a magenta, and red + green a bright yellow.

If we photograph this chart for reproduction by the three-color process, the red filter negative will be represented by fig. 2, the green filter negative by fig. 3, and the blue filter negative by fig. 4.

Now we must print the red filter record in the complementary color to red, *i.e.* in green-blue ink, so that we get fig. 5.

The green filter record must be printed in the complementary color to green, *i.e.* blue-red, or magenta, ink (fig. 6).

The blue filter record must be printed in the complementary color to blue, *i.e.* red-green or yellow ink (fig. 7).

These three blocks superposed will then give us our original (fig. 1). Now examining it carefully we see that we have obtained—

Scarlet by printing full magenta on full yellow.

Green by printing full green-blue on full yellow.

Blue-violet by printing full magenta on full green-blue.

Consequently to fulfil tri-color theory all the green we want must be contained in our green-blue ink, as well as in the yellow; all the blue-violet we want must be contained in our magenta ink, as well as in green-blue.

The commonest defects in tri-color inks are that the red is too scarlet and does not contain enough blue.

As a consequence, in order to obtain pure blues, a blue ink is chosen that is too violet in hue, and such a blue ink does not contain enough green, with the result that all the greens look brown.

As a result of this difficulty some blockmakers think that their green filter should record all the blue so that no magenta ink will be printed on blues, because, since their red ink is too scarlet, when they print it on the blue ink they do not get blues at all, but blacks.

Unfortunately this introduces other difficulties, inasmuch as the greens in the picture will not be properly exposed before the plate generally has received enough exposure, so that magenta then prints on the greens, and they are in consequence nearly black.

There does not therefore seem to be any net advantage to be gained by altering filters if inks are unsatisfactory. The best thing to do is to get the best inks obtainable and then correct for errors by fine etching.

If a fine-etcher is to do good, accurate, economical work, he must compare a *color proof* with the original before commencing.

Few, if any, fine-etchers can tell from three black proofs exactly what a combined color proof will look like, and a little too much work by the fine-etcher necessitates far more work to remedy it.

With regard to the best inks:—

The yellow ink is easy to make and generally satisfactory.

The magenta ink is very difficult to obtain as a *permanent* ink.

But the blue-green ink is usually the most inaccurate, and with this color it is difficult to secure permanence.

We have no financial interest in printing inks, but as we supply some portions of the material for three-color reproduction in the shape of color filters and color-sensitive plates, it is a matter of importance to us that these materials, which we know are absolutely suitable for their purpose, should not be blamed for defects arising when another portion of the material, which we have not supplied, is defective.

Further, we have found that our customers have often been uncertain as to which are the most suitable inks to use, or they have found them troublesome to obtain if they want them to fulfil necessary requirements in the shape of easy working in the press, and permanency.

We therefore arranged with Messrs. Mander Bros. of Wolverhampton to make a series of experiments which resulted in our deciding on the following inks which we can recommend as being the best in hue that we know, as being of sufficient permanence for ordinary work, and as being satisfactory in working on the press:—

Complementary red, 0367.
Complementary blue, 0368.
Complementary yellow, 0366.

These inks can all be obtained from Messrs. Hunters, Ltd., Poppins Court, Fleet Street, E.C., who are sole agents for these inks.

There are undoubtedly other satisfactory inks on the market, and probably most ink-makers would supply inks of any desired shade.

Those who wish to examine their own inks can obtain a special ink-tester devised by us, from Messrs. Hunters, Ltd.

Correspondence.

THE NEW FOUR-COLOR PROCESS.

To the Editor of "The Process Monthly."

DEAR SIR,—As my four-color process is mentioned in comparison with Mr. Geo. Woodiwiss's four-color process, both in the November and December issues of *The Process Monthly*, I may be pardoned if I offer a few comments on the subject.

It appears from Mr. Woodiwiss's letter that he is not aware of the fact that his process embodies the principle of two pairs of complementary reproduction colors. His red (approximate wave-length 7000, as stated in your November issue) and his blue-green (wave-length 4900) are complementary colors, and will produce black if mixed as pigments in proper proportions, or white in optical synthesis. Again, the proposed greenish-yellow (wave-length 5500) and violet (wave-length 4250) are complementary colors, and possess the same properties as the foregoing pair, as far as additive and subtractive methods are concerned, especially if each of these two pairs are a little adjusted as regards wave-length, a latitude which Mr. Woodiwiss permits. If this adjustment is carried out to about the same degree as regards each color and extended far enough, they will coincide with the four colors I adopted, after long and careful experiments and consideration.

To illustrate this graphically we need only refer to the color circle I have previously published. Mr. Woodiwiss's violet then becomes my ultramarine blue; his blue-green, my green; his primrose yellow, my yellow; and his carmine red, my magenta (I am purposely using popular terms). My long daily experience in color mixing, moreover, has taught me that Mr. Woodiwiss's violet and blue-green will not make a good ultramarine blue, nor will his carmine red and violet ever make a bright magenta.

There is no need for roundabout work, even assuming for a moment for argument's sake that Mr. Woodiwiss's colors were the best four which ever have been or will be proposed. Four properly adjusted selective filters will do all which is required. Broadly speaking, a spectrum-red filter will be required for his blue-green printer, and a blue-green filter for his red printer. Again, a greenish-yellow filter will be wanted for his violet printer, and *vice versa*.

I do not accuse Mr. Woodiwiss of copying me. I should be very sorry to do so, and am willing to give him credit for an original endeavor. Nevertheless the fact remains that in the process he has patented he has at least unconsciously adopted a principle which is practically the same as my own, and really only an unnecessary modification of doubtful value.

As I do not wish to enter upon any public controversy, kindly consider this my first and last communication on the subject.—I am, sir, yours faithfully, C. G. ZANDER, F.R.P.S.

"SCREEN NEGATIVE-MAKING ON DRY PLATES."

DEAR SIR,—It has been pointed out to us by Mr. Howard Farmer that the paragraph on page 6 of our booklet "Screen Negative-making on Dry Plates," which deals with the illustration prepared by making screen negatives of a small black wedge, might be taken to imply that we suggest that by the use of dry plates a range of 1 to 1000 could be rendered in screen negatives.

If the paragraph is read carefully it will be seen not to imply this, and we do not wish to make any suggestion of the kind. The "range of intensity of 1 to 1000 in less than half inch" was given simply to show the steepness of gradation of the wedge. The blocks shown are about four inches long, and are of a magnification of 30 diameters, so that they correspond to only about one seventh inch on the wedge, that is, to a range of about one to eight in intensity. The gradation, which is rendered in a screen negative, is of course almost entirely independent of the plate, being defined by the half-tone screen itself.

We are asking you to insert this letter, as we do not wish people to think that we make claims for any of our products which we are not prepared to substantiate.—We remain, yours faithfully, WRATTEN & WAINWRIGHT, LTD.

WE CAN BEAT THE GERMAN producer of trade catalogues. He uses the languages, weights, measures, and moneys of his export customers, but we can do more, by illustrating *fully*. Block-makers' travellers should remind all manufacturers amongst their customers of the international power of illustration. It needs no translating.

School Notes.

THE BOLT COURT SCHOOL.—We wish to draw attention to a most interesting series of Tuesday evening lectures that are starting on January 5th, the subject of which is "Elementary Chemistry and Physics, and their Relation to Photo-engraving and Lithography," by Mr. A. J. Bull. Process engravers will have a means of gaining information that it is almost impossible to obtain anywhere else, as the subject in its application to photo-engraving is not, as a rule, included in lecture syllabuses.

THE BOLT COURT LECTURES. — 7th Jan., Arthur Cox, Esq. (the Arthur Cox Illustrating Co., Ltd.): "The Commercial Side of a Photo-Engraving House"; Jan. 14th, M. H. Calmels: "New Considerations on the Theory of the Cross-Line Screen"; Jan. 21st, C. E. Kenneth Mees, Esq., D.Sc.: "Some Applications of Theory to Practical Photography"; Jan. 28th, R. Vincent, Esq. (manager of the photo-engraving department of the Amalgamated Press, Ltd.): "The Process Man—A Character Study."

Brevities.

THE FARMER-ZEHR ENGRAVING COMPANY has just been incorporated in Jersey City. Capital, $15,000.

A COMPLETE PROCESS PLANT has just been installed by *The Albuquerque Journal*, of Albuquerque, Mexico.

THE CO-OPERATIVE PHOTO-ENGRAVING COMPANY, of New York, has just been incorporated with capital of $10,000.

THE SCHAUM ENGRAVING AND PRINTING COMPANY, Milwaukee, has taken over the business of the Clarke Engraving and Printing Company of the same city.

THE NATIONAL ENGRAVING COMPANY, Washington, D.C., was burned out of its old premises, but is now fully equipped at 405 Eleventh Street. It is erecting a new building on its old site.

"THE OTAGO WITNESS," of Dunedin, New Zealand, send us their Christmas Annual. It is a most interesting production, full of illustrations representing many different phases of New Zealand scenery.

JOHN KIDD & Co., of 11 Wine Office Court, London, send us a most useful desk tear-off calendar, arranged for a week's engagements on a sheet. They are issuing this to their numerous customers.

THE CAMERA CONSTRUCTION Co., Durham Grove, Hackney, London, send us a very nicely got up descriptive catalogue of their new "Machine" camera and stand, which they will be pleased to send to any process firm on application.

"TRADE UP" is a motto that is being pushed by the American business boomers. It is an exhortation to emphasise quality rather than cheapness, to put the more expensive goods in the shop window and catalogue, and generally to aim at increasing the average price of one's output.

"THE WORCESTERSHIRE ADVERTISER."—We are pleased to note an addition to the number of newspapers that are now making use of illustrations. An illustrated supplement is now issued each week by *The Worcestershire Advertiser*, containing half-tone reproductions of current events.

IT'S THE 'AMMER, 'AMMER, 'AMMER at the 'ard, 'ard 'eads that makes success in advertising. Remember (and don't let your customers forget) that a tasteful circular can go where no commercial traveller can; but that to ensure success it must be oft repeated, and every time with a fresh, bright, illustrated appeal. I say *illustrated* appeal.

A NOVEL ADVERTISING NOTION is that of the Central Engraving Company of Cleveland, Ohio, which has been doing a set of designs printed on a semi-transparent paper, the proof in front being simply a black half-tone, while washes of color are printed on the back. The color-effect is seen by holding the print to the light and viewing it as a transparency.

"NEW ZEALAND ILLUSTRATED," being the Christmas number of *The Weekly Press*, reaches us from Christchurch, New Zealand, and it is indeed a fine production, full of fine half-tone illustrations, many of them being printed in several colors. Such a number as this clearly demonstrates that the process work of our colonies ranks with the best that is produced in the old country.

COINCIDENTAL PATENTS.—It is curious (though not unusual) that two patents so exactly similar in aim and in method as Munkenbeck's, published last month, and Bells', which we shall give next month, should be worked out simultaneously. Munkenbeck claims from New York (application June 5, 1907, accepted June 5, 1908); and the Bells from Sydney (application Dec. 3, 1906, accepted Sept. 5, 1907).

HEIGHT AND WIDTH. — Trouble would be avoided often if customers and blockmakers would insist that an illustration has only two dimensions, height and width. The height is always the distance from top to bottom; the width is always the distance from side to side, whether the block is tall and narrow, or short and wide. Other terms should not be used; never speak of the "length" of an original.

GETTING AN INTRODUCTION is often the traveller's greatest difficulty. Persuade your customer to use printed "silent salesmen," in the form of well written, well designed, well printed, and well illustrated—I say well illustrated—circulars. Let your customer ask the king's servants for adhesive impressions of the king's head, and these impressions will influence the king's messenger to introduce the silent salesman to any house in the land.

ILLUSTRATIONS SPEAK ALL LANGUAGES.—Our Board of Trade, our foreign consuls, and all who are interested in the nation's export business, are urging manufacturers to print their catalogues in the languages of the people to whom they are sent, and to employ travellers who speak their tongues. Process men should never cease to remind manufacturers that "illustrations speak all languages," and that the successful catalogue is the one well filled with efficient illustrations.

PRAISE FROM THE PRINTERS.—"The I.P.E.U. is the youngest and smallest of the labor organisations connected with the graphic arts, but we commend the quality of its ambitions. It is devoting time and energy to the conservation of the health of its members, tendering efficient aid to those afflicted with tuberculosis, and preparing the way for the scientific and systematic trade education of the craft. The man or organisation imbued with such high ideals and striving for such ends is worthy of every encouragement, and *The Inland Printer* is glad to extend a helping hand to any and all such agencies, and it compliments the engravers on the helpfulness and hopefulness of their programme."

AN UNUSUAL ADVERTISEMENT was given to the Eclipse Electrotype and Engraving Co., of Cleveland, O., by the purchase and circulation amongst its customers of 2500 copies of the *Dictionary of Engraving* just published by William Henry Baker, and noticed in last month's issue. The book is in no way disfigured or mutilated for advertisement purposes; it has simply a modest fly-leaf, stating in twenty-six words that it is one copy of a special edition distributed with the compliments of the Eclipse Company.

"MEASURED BY RESULTS, good printing plates cost less than you think." . . . "Put not your trust in cheap plate-makers." . . . "Do you know that it costs more to print a poor plate than it does a good one?" . . . "An advertisement is like a woman: it may be pretty or plain, but is not a success unless it attracts." . . . "A common thing done uncommonly well means that the outcome is attractiveness." These lines are quoted from the latest ad. booklet of the Eclipse Electrotype and Engraving Co., of Cleveland, Ohio.

IN HALF-TONES OF MACHINERY a new and very practical specialty has been adopted by the Reveille Press of Vevay, Indiana, which prints the illustration of the machine in three or more colors, then uses a fourth block to print the names of the different parts with arrows pointing to the actual parts nominated. Thus the names of the parts are arranged all around the view of the machine itself, and there is not the need for cross reference to another page, which is often found when the parts are merely indicated by letters or numbers.

END-PAPERS IN HALF-TONE.—End-papers, those delicate decorative pieces that are placed inside the covers of books by the clothbinders, are now being produced by half-tone largely. Thus letterpress scores in another field which, until very recently, was monopolised by lithography. Fancy designs in variety, including many representations of wood-grain, marbling, etc., are reproduced in large blocks, and printed in soft-colored inks,—light browns, slate greys, and salmons, upon white or slightly tinted papers. The results are very pleasing, and the papers are cheap.

"NOTES ON PHOTO-MECHANICAL GRAINS" was the title of a paper recently read before the London and Provincial Photographic Association by Mr. A. J. Bull of the Bolt Court School of Photo-Engraving. He illustrated the paper with examples of results obtained by half-tone, Levy four-line screen, 60° screen, ruled plaster relief (Petit's process), the Akrograph (Amstutz), Wheeler's Metzograph, Spitzertipie, lithographic chalk on grained stone, collotype, inverted photogravure, photogravure and machine-printed photogravure. The paper is well reported in the *British Journal of Photography* for November 6th.

Ill-treatment of Half-tones.—A writer in *The American Printer*, speaking of the way in which half-tones are damaged while actually on the press, lays blame upon the cleaning rags often used by the apprentices. These sometimes consist of old cloths from which the buttons have not been cut, and they often have been thrown down on the floor or on a bench where there is much dirt and grit. Another cause of trouble often unsuspected is scratching by the buttons on the pressman's jacket or shirt sleeves, which may do serious damage when he is leaning over the cuts to make some alteration at the further side of the forme.

British Cost and Selling-Price.—A process firm which is interested in the Benedict method of taking out costs, though it does not see its way to adopt the "scale," gives us the following figures as actually ascertained in its own business:—Average size of cuts handled = 15 sq. in. Shop cost (ascertained exactly on Mr. Benedict's lines) = 57 per cent. of average selling price. All other costs, including bad debts, directors' fees, office and management expenses, 10 per cent. depreciation on plant; 2 per cent. depreciation on premises, and everything, in fact, except profit payable to capital = 31½ per cent. Total, shop and administration cost = 88½ per cent.; leaving a profit balance of 11½ per cent. on turnover. As the capital is turned over twice a year, and two and a half times in the best years, the profit equals from 23 per cent. to 28¾ per cent. on the capital.

Charges of Carelessness.—A photographer who exhibits, and whose pictures are in demand for reproduction, asks us to insert a plea for better supervision and care of originals when in the block-makers' hands. He writes:—"During the past two years I have had one print ruined through etching solution being splashed over it; one through a piece being jabbed out of the sky; one broken clean in halves; one cracked and badly finger-marked; and one framed oil print smashed to pieces, print and frame being utterly ruined."

We pass thousands of prints per year through our own hands, and are glad to bear testimony to the rarity of serious accidents, though we have had valuable originals spoiled occasionally. Perhaps these lines may meet the eye of some engravers unfortunate enough to be served by careless men, and may lead to the prevention of further disasters.

Etching Steel.—The Spencer acid and method, which are generally used, are as follows:—

A. Nitric acid, c. p., 5 ounces; distilled water, 5 ounces; pure metallic silver, 1 ounce. B. Nitric acid, c. p., 5 ounces; distilled water, 5 ounces; mercury, 1 ounce.

Make up separately, mix, and store in a glass-stoppered bottle. For use dilute with water almost one-half. Lay the steel so that the portion to be etched is in the acid, but that some part remains outside, and bend a piece of strip zinc so that one end comes in contact with the bared steel and the other dips into the acid. This generates a galvanic action which starts the acid etching immediately, when the zinc can be laid aside and the liquid continues to eat into the steel until it becomes exhausted. To etch further, absorb the spent acid with blotting-paper or a sponge, and pour on some fresh acid.

The Frey sand-blasting process, described on another page (6), has interesting suggestions which may be useful to process men who have no interest in sand-blast work. The toothed flexible scraper for securing uniform thickness of film on curved surfaced plates seems practical and ingenious. We are not told, however, how "ordinary photographic plates" are to be used to print on these curved surfaces. Further, as anyone acquainted with carbon printing well knows, prints from an "ordinary" photographic positive or negative will not develop evenly from the side which is exposed to the light, but need transferring. Moreover, even if they were developed as (say) carbon transparencies, their graduated thickness would make them unsuitable for sand-blast etching, which needs a resist in the nature of a stencil. Therefore, although an "ordinary" photographic plate is mentioned, it is evident that a plate made from a line drawing or stencil design is intended.

We do not Read Enough.—Mr. William Gamble said, in addressing the photo-engravers of New York, some time ago:—"You *indifferent* fellows will surely get left if you don't keep up with the procession. Read trade journals, all of them if you can possibly afford them, to see what others are doing. Read all the books, good, bad or indifferent, that you can lay hands on.

"Read and *think*, and when you have cleared out some of the cobwebs and the rust within your 'thinking box' you will find new things all about you."

We quite agree. Will every reader of this magazine become a *subscriber* for next year; and be good enough to show one of his copies to his fellows in the craft?

Subscription is the same price as buying single copies; it can be paid direct or through the agents; it ensures regular and prompt delivery direct, through the post; and occasionally it means a special or a confidential supplement, which cannot be enclosed in the whole issue.

ENAMEL SOFTENING IN THE ETCHING BATH.—A correspondent of *The Inland Printer*, who is in difficulties with his etching, writes as follows:—"I use saturated solution of iron diluted one-half before etching, and no matter how much I dilute it, the iron gets through the enamel." The reply may interest other beginners:—"The cause you assign to the softening of the enamel coating on the copper plate is the reverse of the real fact. It is water that softens the enamel and not the iron in solution. If instead of diluting the iron solution and washing the enamel-coated plate frequently under the tap, you will keep the iron solution as highly saturated as possible and prevent water reaching the plate until after the plate is etched, the enamel will not soften. The principle is this: Water absolutely saturated with iron is so affectionately attached to the iron that it will not give up the iron for an 'affinity' like the glue in the enamel. Some operators keep a lump of iron in the etching bath so as to keep the bath saturated, and this is a good idea. Your enamel formula is correct."

LINE VERSUS HALF-TONE.—There are many signs that "line" illustrations are growing in popularity, and that they will be used very largely in the more important books and magazines ere long. *The Practical Printer* says:—"Of all engravings, the line cut has the greatest range of usefulness so far as the paper is concerned. Line cuts will print on anything, from the coarsest antique cover, the hard-surfaced bonds and linens, to the extra-fine coated enamel or chromotype. The great majority of illustrated covers are line cuts. Many beautiful pen-and-ink illustrations, whose fineness of line rivals woodcuts, are made in line. These have the advantage of the half-tone, as they can be printed on antique finish stock and have a remarkably artistic effect. If so desired, they can be printed on enamel book or super stock. The artist must be exceptionally clever to produce original drawings of this class, but his reward is worthy of his best efforts, as many publishers of *de luxe* editions prefer the fine line engravings above all others. For an appearance of sketchiness the line etching is unsurpassed, showing clearness and beauty of line otherwise unattainable."

"PENROSE'S PICTORIAL ANNUAL," 1908-9.—The new volume of the *Process Year Book* is uniform with its recent predecessors in arrangement, and once more all those in any way connected with the graphic crafts have reason to be grateful to the editor, Mr. William Gamble, for the production of a volume which is more than a verbal record of the state of process work, being, in fact, a demonstration of what is being actually accomplished by firms in all parts of the world. That there is nothing shown which can be singled out as forecasting a revolution in illustrative methods is not the editor's fault, for the contributions by himself and others cover the technical advances of the year very completely; and as for the supplemental plates there are enough to represent every description of process, perhaps at the risk of overburdening the volume with examples which have little interest beyond the fact that they are the work of such and such a firm.

In the editor's review of the year's process we are glad to see prominence given to the use of a paper containing a minimum of mineral "loading" for the printing of half-tones. This *à propos* of Mr. R. W. Tindall's strictures at the Bolt Court School on the heavily loaded "art" papers. Two other processes which have come into notice during the year are editorially described—the direct block-making in the camera of Mr. Arthur Payne, and the two-color cinematographic projection of Mr. J. Albert Smith. Mr. A. J. Newton writes on the use of irregular grain screens, and Mr. Howard Farmer on the mode of action of ruled screens in photo-engraving. Of other notable contributions may be mentioned:—"The Use of Albumen Paper in Photolithography," by Prof. R. Namias; "The Use of Color Contrast in Technical Photography," by Dr. C. E. K. Mees; "The Correction of Engraved Copper Plates by Electrodeposition," by General Waterhouse; and numerous notes on Process Photography, by F. Fissi.

We can only say what we have said on previous occasions, that between the covers of the *Process Year Book* the photo-engraver or process man possesses a yearly record which he can obtain in no other way.

Answers to Correspondents.

The editor and staff undertake to answer questions on all subjects connected with the production and printing of illustrations; only on the following conditions:—

1. That each question be written separately, on one side of the paper, and have the name and address of the sender.

2. That stamp for reply be enclosed.

Answers in this column are not guaranteed, but *all replies are sent by post, direct,* as soon as we are able to deal with the queries.

Brass Name-plate.—"We have an inquiry from one of our Indian clients enclosing the plate sent herewith, and requesting information as to the method of etching and coloring the same. Can you obtain any information for us on this subject? You will note that it is a brass plate, silver coated (nickel plated)."

The way brass work is done in England is first to make a good negative of the type matter, and then coat the brass with an enamel which will burn in a rich black, and then etch the brass in perchloride of iron face downwards until the necessary depth is obtained, and afterwards electroplate it. The example you send appears to be done somewhat differently, inasmuch as it would seem as though the etching was made, then the type matter rolled up with varnish to make it black. This varnish has touched on the ground, and the consequence is the electroplating has not taken in places. Usually English work is very much whiter and brighter than sample. I should say this white might be done by coating the brass with a deposit of copper first and then silvering it by flowing over it a solution of cyanide of silver in the well known way, but of course the ordinary method of electroplating is better, and is the one commonly adopted.

The best plates of this kind, brilliant and durable, are made by etching deeply and filling with niello, for which I quote a typical formula, easily fusible, from *Etching on Metal, Niello and Metal Engraving*, by Thomas Bolas (price 6d. net; Dawbarn & Ward, Ltd.). The formula is:—

Native sulphide of antimony * - -	2 parts.
,, ,, of lead (galena) * - -	1 part.
Sulphur, in small fragments or powder	8 parts.

(* finely powdered). These must be gently melted in a crucible, with constant stirring; poured on to a clean stone or tile. For use, score the space to be filled, with sand or grit; fill rather more than full, with coarsely powdered niello; level, and heat with bunsen gas flame or clear charcoal fire until the niello melts into the hollows. Further instructions may be found in the book quoted.

Collotype Queries.—"(1) Is it possible to get a perfect image by collotype on rough surface paper similar to C.C. platinotype? (2) Do you know names and addresses of any French firms supplying all the requisites for collotype?"

Everything depends upon what you call a perfect image. Very beautiful collotype prints are frequently done on such surfaces as you mention, but, of course, the result is distinctly "broad" and will not give you the same minute detail as you get when printing from the same subjects on extremely smooth surface paper. Henri Calmels, of 150 Boulevard du Montparnasse, Paris, supplies all materials for collotype and other photo-mechanical processes.

Etching Steel.—"In vol. xii. *Process Photogram*, p. 115, you have a formula for etching steel. About two years ago I made up two formulæ, but had some difficulty in getting the *nitric ether* from even a well known firm of chemists in Newcastle. At last, after waiting a few days, they got for me what they said was right, and on their label was *spirit of nitrous ether.* On repeating this order a few days ago for this liquid they sent me spirit of nitre, which their chemist says is the same as nitrous ether, but which is no good for etching purposes, while the solution which they supplied me with two years ago and used in the given formula worked splendidly. Could you advise me on this point? as I wish to use this formula if possible, having tried several, but found this one best to use with a bitumen-ground. Rhind's Liquid Etching Ground is what is used. This is not for half-tone etching, but for hand-engraved sheet dies, with views, etc., etching with above."

Spiritus ætheris nitrosi, spirit of nitrous ether, and sweet spirit of nitre, are all the same thing. It is a B.P. preparation, and should contain 2½ per cent. of ethyl nitrite (1¾ per cent. is the B.P. minimum). It is very liable to deteriorate with age. The best thing to do is to go to someone who makes it, like the Apothecaries Hall, or Messrs. Harker, Stagg & Morgan, Emet Street, London. Both are wholesale manufacturers, and the Hall is also retail.

plate should be roughened so as to hold the substratum better.

WIRE TO MAKE THE NEEDLES FROM.—Messrs. Royston & Co. of Halifax manufacture straight steel wire and had at that time a patent for the same. Its commercial price was about one and sixpence the pound, but for our purpose a far higher price had to be paid, as it must be drawn through the last two holes with new diamonds. The reason of this is that the wire should be made as round as possible and must be straight. Test the latter as follows:—Take a six foot length and place it on a smooth deal board free from dust, roll it with the forefinger. If there is any curve it will show at once. It should roll like a ruler: if it does not do this the sample must be discarded, as the fault will run through the whole quantity. This is most important. An infinitesimal fault in the straightness of the needle becomes most serious when they are in bulk. It will be sufficient to upset their "formation" (this term will be explained later on) when they come to be inserted in the chase, it also acts like a spring, which will not allow them to pass freely on to the relief.

MEASURING THE RELIEF WITH MICROMETER CALIPER.—One would naturally suppose it should be taken from the highest light to the shadow, but this is absolutely wrong, for the following reason. In measuring a head and bust the same as illustration (see last issue), the spots in the eye, jewel or bead, are the highest lights. The measurement must be taken from the brow or line of nose; these are the true high lights. The spot in the eye, etc., has more value than the high light of brow; in the latter it will be found to measure, say, ·0012, but the spot in the eye ·0014 of an inch. By taking the measurement ·0012 it would, in the finished print, have a clear spot in the eye, as the needles that represent this would be two points below the high light of brow; also the true half-tone of the subject would be upset.

WIRE MEASUREMENT TO ASCERTAIN THE DIAMETER OR GAUGE TO USE.—This is decided by the depth of the relief. Electrotyping the needles makes this arbitrary. On examining the electro the illustration was done from, there is a faulty hole in the centre of the dot in a large number of the half-tone ones. These can very likely be seen, with the aid of a glass, in the print. I shall refer to this again.

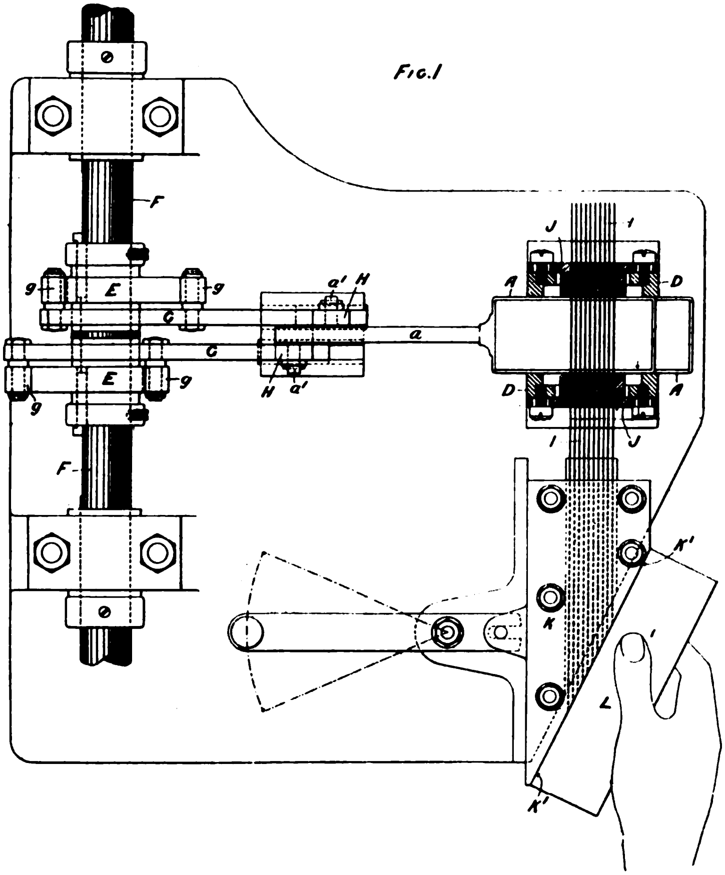
WIRE POINTING MACHINE.—For general description of this reference must be made to specification of Patent No. 11,740 A.D. 1896, of which the following is the gist:—

"Fig. 1 represents a plan and fig. 2 a longitudinal sectional elevation of the machine.

"Fig. 3 shows a cross sectional elevation of the reciprocating slides for rotating the wires and fig. 4 shows an end view of the oblique plane at which the ends of the wires are exposed to the grinding action.

"The same letters of reference indicate the same parts in all the figures.

"The machine comprises two or more reciprocating slides A, four such slides (forming three operative pairs) being shown in the drawing, the said slides being mounted between upper and lower pairs of pressure rollers B B whereof the upper pair is mounted in a spring pressed follower C capable of applying regulated pressure and guided vertically in a standard D by which the slides A are also guided in their reciprocating motion. Reciprocating motion is imparted to the slides A in a direction at right angles to the wires by means of two cams E E (preferably heart-shaped so as to produce a uniform motion of the slides throughout the stroke) oppositely fastened to shaft F, motion being transmitted from said cams through friction rollers *g* to rods G whose ends are fastened to sliding crossheads H working in suitable guides. To the crossheads are fastened the rods *a* of the slides A, alternate slides being coupled to one crosshead, the others being coupled to the other crosshead. The rods *a* engage with the crossheads by means of pins a^1 fastened to the rods *a* and passing through slots in the crossheads. Between each two oppositely moving slides A is placed a row of parallel wires I of steel of very fine and absolutely uniform gauge, the wires lying side by side and passing through vertical slots in adjustable plates J.

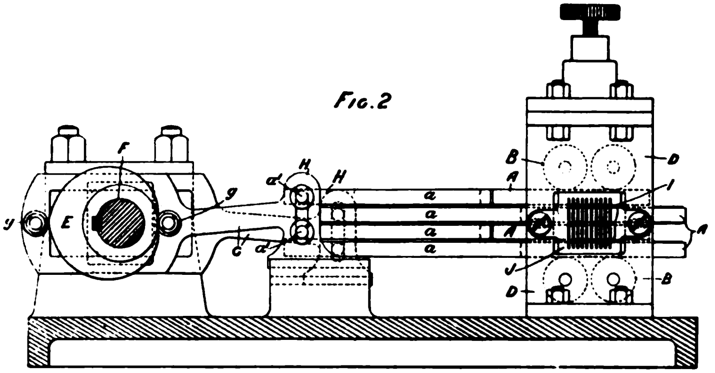


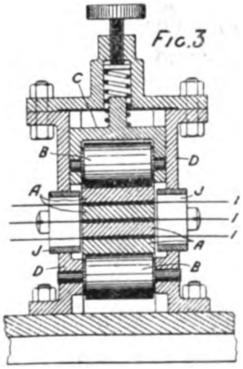
"As the oppositely moving slides A have equal velocities, the wires gripped between them roll against the oppositely moving faces of the slides and are thereby slowly revolved each about its own longitudinal axis without change of position. When four such slides are used there may be three tiers or rows of wires operated on simultaneously, as in the example illustrated. To enable the slides to grip the whole of the wires uniformly they are faced with slips of hard and yet elastic material, for which purpose celluloid is found most suitable. The celluloid is used in the form of thin facing strips which need not be attached to the slides and should be renewed daily or oftener if necessary, oil being plentifully supplied to these surfaces when working, care being taken to keep them and the wires and guides free from grit.

"The wires pass on leaving the reciprocating slides A, through guide holes *k* in a block K whose face K^1 is a plane oblique to the direction of the wires, the angle of obliquity corresponding to the angle or pitch of the cone to be produced. The guide holes *k* extend through the block K to the oblique plane K^1 at which the ends of the wires slightly project so as to meet and be revolved in contact with the face of an oil stone L which is pressed and reciprocated by hand against said face K^1, the motion of the stone being in a slightly circular or eccentric orbit so as to vary the points of contact of the wires with the stone in such a way as to distribute the wear of the stone and maintain a uniformly true grinding surface. The block K is fitted to slide in guides upon the base plate in the direction of the length of the wires, and is movable in its guides by lever or screw adjustment to enable the grinding surface to be fed up to the work as the formation of the cone proceeds.

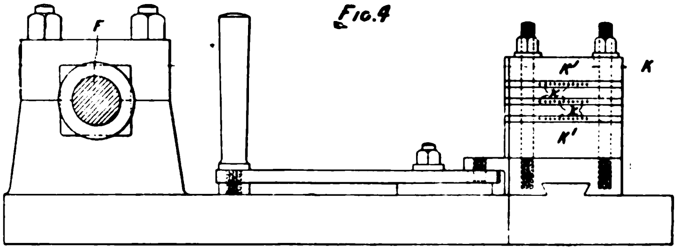
"The guide holes *k* are preferably formed by what is known as "bushing" wire, being tubular brass wire. The lengths of bushing wire are soldered together side by side to form a plate having a row of holes in it, and the plates for the different rows or tiers of wires are firmly clamped between the sections of which the block K is built up. The ends of the bushing wires where they emerge at the face K^1 might be jewelled, and to save the jewels being cut by the burr on the rough ends of the wires at the beginning of the operation the face K^1 might be covered by a false face plate having holes corresponding to those of *k* through which the rough ends of the wires would protrude so as to enable the rough burr to be taken off and the wires nearly pointed by a

Turkey stone, after which the false face plate would be removed and the points finished by grinding with an Arkansas stone applied against the jewelled face K^1. When the grinding operation is terminated the pressure on the wire operating slides A is relaxed, the pointed ends of the wires are fed forward, the wires cut off of uniform length to a gauge, and the wires and slides re-adjusted for repeating the grinding operation."





I daresay I am not the only one who has applied for a patent with an incomplete specification, and so I found out before I had come to the end of this process.



On page 3, lines 12 to 15, fig. 1 in drawing, the stone marked "L" is discarded and in its place a two-inch circular Arkansas stone should be used, and ought to revolve at the high speed of about 1500 revolutions per minute. This stone is mounted upon a slide rest and geared from the main shaft so as to work automatically and should be made to pass the wires at each end of the block; if it does not do this a facet will be given to the needle point. This is owing to what is called maximum and minimum, also back lash of the reciprocating slides. At this period the wires are not revolving. Plenty of oil has to be used on the wires, otherwise the face of the stone becomes glazed.

When I came to the bushing wires, and to get them jewelled, I found the price was one shilling or five shillings each. Unfortunately I decided upon the cheaper ones, and found them useless, as they were much too thin to be set firmly. In their place I used dead hard steel. This was not sufficiently hard to withstand the wear; the consequence of this was that the needle points became longer and longer as the stone was pressed against the wires. This long point is the reason of the faulty holes in the electrotype. During the growth of the shell, these long points close up before they become solid, and the consequence is a minute hole is left in the centre, and they also do not represent the true value of the relief. This same fault takes place in electrotyping a fine rule; if too deep it becomes rotten. I finished the set of needles under these imperfect conditions with the flat oilstone "L" worked by hand, and the illustration was made from them.

Finishing the Needles.—They must be all one length and without burr. This is anything but easy to accomplish, as the sharp point has to be contended with. When a set of needles has been cut from the machine they are inserted side by side in a small frame with their point against a removable piece of flat zinc; this has to be frequently changed. They are then securely fastened down in the frame which is then inserted in the block the wires revolve in. This set of needles will be ground to the right length at the same time the wire is being pointed. This method gives the least burr of any I have tried, and what burr there is must be removed. Finally they are polished, cleaned, and placed in small metal trays ready for the chase.

(*To be continued.*)

Some Remarks on Enameline Printing.

By R. B. Fishenden.

Whilst the methods of making an enameline print are widely known, there exist many erroneous ideas which are either harmful to the work or cause an unnecessary expenditure of labor. It may be useful to describe a simple method of procedure, laying stress on the particular points which are likely to cause difficulty.

Printing on Copper.—The copper should be cleaned with flour emery, applied with a soft nail brush, polishing in the direction of the original polish. Engraver's charcoal may be applied if there are many scratches, but it is well to finish off with flour emery, because the cuts in the polish are finer than when charcoal is used for the final polishing.

With regard to the enameline formula, it is advisable to keep it as simple as possible, and the following will be found to work excellently:—

Le Page clarified fish glue	100 c.c.	2 ounce.
Ammonium bichromate (20 per cent. sol.) - -	50 c.c.	1 ,,
Water - - - - -	150 c.c.	3 ,,
Ammonia ·880 - - -	4 drops	2 drops.

Or for those workers who do not keep a stock solution of ammonium bichromate:—

Le Page clarified fish glue	100 c.c.	2 ounces.
Water - - - - -	200 c.c.	4 ,,
Ammonium bichromate -	10 grams	87 grains.
Ammonia ·880 - - -	4 drops	2 drops.

There is no need to add ammonia if the solution is not required for immediate use, its purpose being the prevention of any tendency to "scum," which is common to all enameline formulæ when freshly prepared. The solution will work satisfactorily for about six days, but gradually darkens in color and becomes more sensitive until a stage is reached when difficulty will be found in obtaining clean prints, due to the bichromate producing spontaneous insolubility in the collodial material. Many of the "sensitisers" which have been suggested at different times act in a somewhat similar way, in that they contain chromic acid, and depend on a partial insolubilisation of the solution for a reduction in the exposure. It has also been suggested that the addition of certain dyestuffs, such as eosine or rhodamine, increase the sensitiveness; but the writer has found no advantage from their use.

The proportion of glue in the formula given will be found suitable for the majority of workers, but it is impossible to give a solution which shall conform to the ideas of all, because the methods of printing vary to such a great extent. It should be remembered that the sensitiveness of a film of fish glue may vary quite irrespective of the proportion of bichromate present, because in order that the print may be satisfactory, the action of the light must penetrate through the entire thickness of the film; therefore, although two films of bichromated glue may be equally sensitised, one will require quite a different exposure from the other, if the coating is of a different thickness. On this account it is of the utmost importance that the whirling should always be done at a constant speed.

A fruitful source of scum is found in the practice of drying face down over a naked gas flame, which has the effect of producing insolubility in the coating. The best way is to dry slowly and away from any gas flame if possible—in any case the plate should be removed from the whirler and dried face up, using the minimum amount of heat. Exposure to white light or the electric arc should of course be avoided.

The practice of using an excessive amount of bichromate in the solution is a great mistake, because any increase beyond the quantity given in the formula has been found by experiment to actually reduce the sensitiveness, and at the same time to be a source of scum in the prints. The cause of the variation in working formulæ is to be found very largely in the different character of negatives which appertain to different workshops. Where the negatives are "cut" to a fine shadow point it is best to work with a comparatively thin glue, whereas with negatives having a large shadow dot a thicker glue solution is to be preferred. In printing from half-tone negatives on dry plates, greater care should be exercised and the printing frame placed at a greater distance from the arc lamp, allowing a proportionate increase in the exposure. This will cause the light to be less liable to print through the dots, which never have the absolute opacity which characterises a good wet collodion negative. The appearance of dry plate half-tone negatives is somewhat misleading to those who are unaccustomed to them, and it will be found that a rather thinner coating of enamel than the normal is desirable.

Care should be exercised that the glass of the printing frame is not allowed to become hot by the heat of the arc lamp, because it will cause a variation in the exposure; and if the heat is allowed to become excessive, it will be liable to cause insolubility. It has been the practice in some workshops where two open type arc lamps have been run in series, to print with both arc lamps at once, the two arc lamps and printing frame forming a triangle; this is a fruitful source of trouble, because the light actually prints round the shadow dots and makes it impossible to develope them cleanly.

After exposure the plate should be washed in a dish or under the tap for two minutes, and then immersed in a solution of methyl violet—one part to two hundred parts of water. Some brands of the dye contain large quantities of dextrine, and this causes a scum over the shadow dots which is difficult to remove. The excess of dye is washed away, the print is examined, and if the exposure is correct the plate is whirled dry. This is a much better practice than allowing the plate to drain, because all traces of still soluble glue are removed at once. If these slight traces are allowed to remain, the print will be far from clean after burning-in. An alternative method of drying is to flow the plate with methylated spirit, which removes a large proportion of the dye and also causes the print to be especially clean; the plate is whirled dry as in the previous case.

The burning-in should be carried to a medium depth, and the plate allowed to cool on a cold slab. The practice of plunging it into cold water is bad, because it tends to soften the copper, and, in addition, sometimes causes the metal to "buckle."

Printing on Zinc.—The making of half-tone blocks on zinc presents some difficulties which are not found in working on copper. In the first place, zinc alters its structure when subjected to the temperature which is necessary to convert the glue print to an enamel; this alteration is a serious disadvantage, because it causes the metal to become soft and brittle. Another difficulty is that the enamel does not form such a sound resist, because the nitric acid has a rotting effect on the print, whereas ferric chloride has little or no influence. The troubles can be overcome in the following manner:—Grain the zinc in nitric acid before coating, but not as much as for bichromated albumen printing; add two minims of 10 per cent. chromic acid to each ounce, or thirty cubic centimetres, of the enameline solution before use and coat the metal twice, whirling after each coating. The addition of the chromic acid would cause scummy prints if used when printing on copper, but with zinc this is not the case. The prints are dried and burned in in the usual way. It is found that prints which have had a long exposure withstand the action of the nitric acid the best, therefore the negatives may, with advantage, be of such a character as will require a long printing.

The above procedure gives an enamel which is satisfactory, but the metal is very much softened by the amount of heating necessary; and whilst this is of little or no consequence if the plates are required for stereotyping, as in the case of newspaper half-tones, it is a serious matter should the actual plates be wanted for the printing of an edition. The heating can be reduced by hardening the prints in a bath of chromic acid or formalin after developing, in which case the heating need only be carried to the stage when the enamel is a golden color, in order to produce a satisfactory resist.

It is well to remember when working on zinc that the print "opens out" in the shadows very considerably on burning in, so that the appearance of the developed print should be heavier than when printing on copper. It is sometimes suggested to use a thicker enamel for zinc printing than for copper, but this practice is not recommended, in that it by no means increases the acid-resisting properties of the enamel, but rather tends to cause it to break up more quickly.

ZINCOGRAPHY is a well known trade term referring to the letterpress line-zinco process. We protest against its increasing use for lithography from zinc. This is also called litho-zincography, planography, and many fancy names. Plain zincography it is not, and it never should be called so.

Temperature in Half-tone Printing.

ALTHOUGH this is a printer's question, the increase of fine block-work has made it so, and the half-tone man ought to know all about it, in order to meet certain complaints that are liable to be raised by printers newly taking up fine half-tone, and especially those who are going on to three-color. An issue of *The Master Printer* recently said:—"A little warmth will greatly help matters, and we would remind our novice that the temperature of the room for color work should never be below 65° (70° is even better), and should always be kept even. Monday morning is always a bad morning for printing, especially in the winter months, and 'Monday morningish' is simply low temperature and rollers unkind. This is easily proved by the smooth way a job will run at the end of a week, when everything is warmed up, and warmth, though important in black printing, is absolutely essential to good color work."

This is all right so far as it goes, but it is an under-statement, and I doubt if any high-class printing-office in America would attempt to work at so low a temperature as 65° or 70° Fahrenheit.

Again and again British printers have bought little lots of the most expensive American inks for the working of special jobs of great importance, only to find them too stiff to work, with the result that they had to be "let down" in a way that would not please their makers. To get the best possible body of ink with a single impression from a half-tone block, it is necesssary to have an ink so stiff that it will only work in a room that is both hot and dry. It is not enough to have the room hot during the middle of the day, but it must be kept at almost, if not quite, the same temperature night and day, week-day and week-end. The difference between British and American conditions is evidenced by the fact that the removal of electricity from paper in the course of printing is one of the every-day problems of American work. While this is partly the result of natural climatic conditions, it is also largely due to the heating of the press-rooms continuously. In Britain special climatic conditions are provided and maintained day and night in certain factories,—as in cotton-spinning mills, and conditions that are just as important, though quite different, can equally easily be maintained in letterpress machine-rooms, though, as a matter of fact, there is probably only one printing-works in the country that attempts anything approaching American conditions. One difficulty that is raised is the comfort of the employés, a problem that is solved quite satisfactorily in the United States, by having dressing-rooms for the men, where they change from outdoor to working costume, and where their ordinary clothes hang during the working day, and are resumed—dry, warm, and comfortable—at night.

One of the reasons against using a very fine, stiff ink is its extra cost, but even this reason is more apparent than real. There is great difference in the cost per pound between two inks which may both be black, but this does not at all indicate the difference in cost per job. The ink with great covering power is used in much less quantity, gives a much brighter, cleaner half-tone impression, with stronger lights and shadows and better gradation, is less liable to smear and off-set, and requires much less cleaning-up of the forme. To work the stiff ink in a cold or "warm" machine-room requires great rolling power, while in a hot machine-room it will work sweetly with less power and fewer rollers.

The results obtained by British printers under their present conditions are indeed marvellous, but set a British machineman to run a forme containing a large half-tone mounted solid on metal, and see what sort of result he will obtain during the first few hours of a Monday morning in winter. The cold block makes the ink work so stiffly that the impression is thin, or patchy, or both, and though this only betrays itself on the half-tone, the same effect must be produced with the type, which is a solid body of metal. Conditions which make the ink work freely on the metal-mounted block would be beneficial to the whole impression. In a press-room that is *kept* hot the metal-mounted block works as well on Monday morning as on Saturday at noon. I say that present results are marvellous. Is it not fair to suppose, then, that the same men, giving the same care and skill, would fully equal the very finest results of their American fellows, if given the same inks and working conditions? And is it not worth while for British printers to consider, and British block-makers to urge, the introduction of these conditions, at least into the press-rooms devoted to the finest half-tone?

Fields for Expansion.

I. Stock Design Blocks for certain Trades.

In spite of the success of some firms who have specialised, most of our process houses are still competing for the same little circle of work—the periodicals and the book-publishers—leaving the outer customers to come forward if they will. There are certain possible fields that have never yet been worked; and one lies fallow to-day that was tilled with great success by the lithographers, engravers, and bag-printers of thirty years ago.

The block-maker who will specialise on designs for the trades, with sufficient energy and capital, will be kept busy enough and happy enough to forget that there is such a thing as a "square inch" price.

For instance, there are hundreds of theatres, and still more hundreds of music-halls and entertainment halls, most of which are good for two or three designs at least every year. They use posters, window-bills, programmes, and advertising dodges of their own, in addition to those supplied by the touring companies; and through the printers they are reachable.

In every town there are butchers, bakers, poulterers, drapers, coal-merchants, and a host of greater or lesser traders, who can be induced to buy special design blocks for invoice forms, envelopes, business-cards, and advertisements, if they can get them for about the cost of the block, without having the trouble and expense of thinking out a design. They do not object in the least to the same design being used by other people in a hundred other districts, if they can have it exclusively for their own locality. And they can be reached through the printers, as well as through the journals of their own trades.

There is no reason way a dozen different stock designs should not be sold to the dozen different (say) drapers in one city, so long as each gets the exclusive use of one design for his own locality.

Every year there are hundreds of bazaars, tens of thousands of concerts and lectures, enormous numbers of races, cricket and football matches, athletic sports, etc., all capable of being taught the value of more illustration in advertisement.

Scattered through the land there are thousands of literary, scientific, and artistic societies, farmers' and fanciers' clubs, harmonic meetings, benefit and friendly societies; all open to use far more illustrated matter than they do at present if someone only organises it for them, presents it attractively, and does not charge too much.

And every year an innumerable army of house-mothers is arranging private gatherings of all kinds, children's parties, Christmas-tree gatherings, bridge parties, whist drives, book teas, tennis, croquet and archery tournaments, dances, weddings, comings-of-age, and what not; fit subjects for illustrated invitations, menus, programmes, and souvenirs.

This is a big field, empty and fertile. Who thought forty years ago that Christmas cards could develop as they have done? Who thought forty years ago that tradesmen's calendars were to build up such businesses as Robinson's of Bristol, or Alf Cooke's of Leeds? Who thought, ten years ago, that picture post-cards could be made to spin the wealth that they have spun? Who would have thought, until Mate & Son proved it, that almost every health resort, and many a country town that is no resort at all, could be induced to publish, and to distribute free of cost, its own lavishly illustrated guide-book?

It is so easy to sit still. But some day some man will enter into this field to till it. And great will be his harvest if he is capable, industrious, and persevering. This may be the day; you, reader, may be the man. But whenever it is, or whoever he be, we hope that he will drop us a line and send some of his early examples.

The thing *can* be begun in quite a small way, if necessary.

And it may, perhaps, be best begun by a partnership consisting of one blockmaker, one electrotyper, and one printer; with arrangements for first call on half a dozen designers, of attainments as varied as possible.

Blocks in Graduated Relief.

II. BELLS' PATENT.

We, William and Harry Bryce Bell, of Mosman, near Sydney, New South Wales, claim an improved manufacture of "half-tone" printing blocks by the production of a block whose surface is formed in relief by the use of which the "overlay" or "make-ready" for printing is almost, if not entirely, dispensed with. In the manufacture of such a block a smaller amount of skilled labor is required in the fine-etching than has heretofore been found necessary in the production of blocks for a similar purpose.

This invention mainly consists in forming the printing surface of a block in relief by subjecting it to a yielding pressure obtained by using a plastic sheet such as lead, leather, or guttapercha in a pressure press, the "back" of the block having previously been prepared and weakened on certain predetermined parts corresponding to the "high-lights" and "half-tones" on the printed surface to permit of the buckling or depressing of these weakened parts, or by subjecting to pressure a comparatively thin shell of metal—upon which a print has been developed and burnt in—superposed upon a mould or die the surface of which is formed with depressions corresponding to the "high-lights" and "half-tones" of the superposed plate, into which depressions the overlaying portions of the thin plate are forced.

In the carrying out of this invention the production of the printing block entails the treatment, in one instance, of both surfaces of the plate; in another, of one surface only of two metal plates; and in a third, the treatment of one metal plate and one gelatine sheet. That surface which is ultimately used as the printing surface is hereinafter referred to as the "face," and the other, which is not used for printing, is referred to as the "back."

In the operation in which both surfaces of a plate are treated, a photographic negative is taken in the ordinary way, stripped on to a thin celluloid film, and allowed to dry thereon. The plate is sensitised upon its "back" and a print taken upon it. The "back" of the plate is then developed, namely, washed in water soaked in an aniline dye, the soluble glue washed out, and the print upon it "burnt in." The plate is then deeply etched to secure the required weakening of the plate upon those portions representing the "high-lights" and "half-tones," the face meanwhile being protected by being coated with an acid-resisting substance or material. When the required depth has been obtained, the "face" is sensitised and a print taken upon it from the same celluloid backed negative, the collodion film being placed in contact with the "face" of the plate, and care exercised to ensure the accurate registering of the prints on the back and front. The "face" is then developed, the print "burnt in," and the plate whilst still hot is placed with its deeply etched "back" upon a hard metal slab in a pressure press and a sheet of lead placed upon its "face." Pressure is then applied to cause the thinned portions to be forced downward to a degree corresponding to the amount of the weakening the plate had been subjected to at these parts. Thus those portions which represent the "high-lights" or "whites," and which have been most deeply etched, are forced downward the most, whereas those representing the "half" or "middle" tones do not sink so far, whilst those portions representing the darker shades or blacks do not compress. Should the plate be allowed to cool after the "burning in" process is completed, it may be reheated to soften it prior to embossing it in the press. Should it be found inconvenient, however, to submit the plate to pressure whilst hot, this operation may be carried out when it has cooled, in which case a sheet of guttapercha, leather, or lead may be used to effect compression in the pressure press. Greater pressure, however, is required in this case. The "face" or printing surface of the plate when removed from the press presents an embossed surface. It is then subjected to the action of a mordant or acid bath to etch the "face," the "back" meanwhile being protected by an acid resist. Owing to its embossed surface, the plate requires comparatively little fine-etching to produce a clean sharp printing surface; thus the time at present employed to effect the fine-etching of a "half-tone" plate is reduced.

The plate is now ready for "proving," and is mounted in the usual manner.

To produce the best effects in printing with a block made as above described, a soft backing on the cylinder or platen of the printing machine may be dispensed with and a hard backing substituted. It will also be found that a printing block made as above described may be used with good results in a worn printing press where slackness of the working parts causes "play," for the reason that the block does not require to "register" with a "make-ready." Owing to the "high-lights" being well beneath the surface they are protected largely from contact with the ink rollers, thus minimising the danger of clogging, and so obviating frequent stoppages of the machine to allow for washing of the plate.

[The patent claims alternative methods: using a thick and a thin sheet of metal, and using thin metal with a thick washed-out gelatine relief.]

Originals for Fine Art Publishers.

Notes from a lecture by Mr. F. C. Batter at the L.C.C. School, Bolt Court.

In the course of his address Mr. Batter said:—"The fine art trade of the present day consists not only of the publishers of large works of art, but also of the houses who combine the publication of these prints with other productions such as Christmas cards, birthday cards, calendars, post cards, and the many side lines appertaining to these goods. The publications of these houses comprise practically every process of reproduction existing, and the originals are carefully purchased in view of the method of reproduction. The first consideration is the question of the selling value of the subject, and this calls forth the fine judgment of the expert, owing to extreme competition and the constant change of the demand of the public. In the course of a year we are called upon to consider many thousands of originals sent in by aspiring artists and designers, and the task of selection is very difficult. Some designs are good but lack the necessary finish for reproduction, whilst others are so bad, both in subject and painting, that even the first students at this school could not discover a method of reproduction. If these budding artists would only take instruction for a time at an art school and then at a technical school like this one, they would sell their designs and save the fine art trade a lot of time and letter writing.

"Originals for large-size photogravures are generally the work of well known artists, and reproduce well, although in many cases where the artist has exercised his licence to use colors difficult to photograph it is on the expert negative-maker, plate-maker, or finisher that we depend for the translation of the artist's ideas. The prints I refer to are published at from one to eight guineas. The trade of late years has demanded cheaper reproductions, and so the publisher has been obliged to find new lines and new methods of production to meet this demand, and also to find good originals to meet the competition. One of the popular picture lines at present, known as the Imperial, is printed in photogravure on plate paper, size 30 × 20 inches, hence its name. What class of original do we want for this? First, the subject must appeal to the general picture-buying public, who like something homely or that has a love episode included in its story; for a picture is only a story-teller, in the same manner as a novel or a book, and the story should be quite plain to the view of the buyer. This is sometimes helped by the title, but the good subject picture should tell its own tale. A good landscape will always appeal to lovers of Nature. In the originals attention is given to details of the small items, unless the desire has been for color-effect; then details are sacrificed to masses of color. The great thing in landscape work is a pleasing view, with some water as a rule, and some interesting figures or animals in the foreground or middle distance. This is always necessary for publication, for, as a rule, a landscape will not sell well if there is not an interesting group to tell a story. The same thing will apply to seascape subjects, which must be well finished, with detail.

"Smaller originals, used for illustration of calendars, etc., as a rule, are in color and can be reproduced either in black and white or color. Although I have spoken of 'finish,' an original is sometimes finished with stipple too much, and when reproduced in three-color will be very dirty where the stipple has been used. This applies especially to drawings of figures and faces or heads, where it is essential for the tints to be absolutely clean.

"The stippling of originals does not matter so much when it is intended to reproduce them in black and white process, as it can generally be remedied by finishing the plates. We notice this very much in photogravure, where the fine-etcher or finisher remedies all these faults.

"Young artists in sending post card originals insist on supplying designs the same size as a post card. These are of no use, as to obtain the best results we must reduce the original. I should say that 90 per cent. of the originals submitted for post cards are tendered in this small size. Consequently they are returned to the senders with no further consideration. The size of original which we ask for is 11 x 7 inches—this is practically four times post card size. We then obtain the best results possible from the originals. Some of the most beautiful water-color drawings I have ever seen have been made for post cards, and although the post card trade is not boomed to such an extent as it was four or five years ago, there is still a great demand for good subjects. Of course, large originals, which are purchased for other publications, are also used in this way, and an original is sometimes reproduced in as many as six or seven different sizes.

"Christmas cards are a special branch of the designer's art, and quality can only be gained by experience in the business. Among the thousands of originals submitted to us for Christmas card work 90 per cent. are absolutely useless, owing to the want of technical knowledge necessary for reproduction. Therefore I repeat my remarks already made, that besides an art education the student should at least acquire an elementary knowledge of reproduction from the technical point of view. Speaking generally, figures are the best class of original. Next come landscapes, but these are often so very crude that they are utterly useless, whereas if a little more attention had been paid to detail, and more care had been taken in working the subject out, they would have been considered first-class."

Cost and Selling Price: A Further Comment by Mr. Arthur Cox.

To the Editor, "The Process Engraver's Monthly."

DEAR SIR,—Having read with very great interest Mr. Benedict's most able criticism of my article on costing, I feel it my duty to write a few words in reply. Before commencing, I should like to shake hands, as it were, and express my appreciation of his efforts to stir up interest among the trade generally in respect to what it is costing them to produce the articles they are selling; I may say also that I am going to, as it were, pull his leg a bit, so I hope he won't be offended.

Mr. Benedict says that I have not grasped the idea that it is possible to ascertain the cost of a half-tone or a zinc etching of any given size. Now that's very unkind of him, for if there is any one thing that I have grasped more than money when I have had the chance, it is the idea that it is possible to do such things as ascertain the actual cost of cuts of various sizes. Having grasped such an idea and carried it very much into effect some years back, has enabled me to organise a business in such a manner that we can know exactly the profit or loss on any job in any department throughout our work at any time. This, I take it, is the right use to make of such knowledge. I may further say that we do not use a sliding scale of charges, but stick to the much abused square inch *habit*, as Mr. Benedict terms it; our selling prices per inch are low, as prices for similar classes of work run; we do all classes from the cheap news work to brightest class catalogue, and we know its cost per inch and per block absolutely; we know not only what it costs when finished, but what it is going to cost before it starts; and all these particulars have been arrived at by using as a base the methods which I have set forth in my article. As regards the difference between Mr. Benedict's system and mine it may be put as follows:—He starts from individual cost to get to average; I start from average to get to individual cost; the ultimate result being that he wants to lower the price per inch on the large cuts and raise the price on the small ones, and I don't; but to go deeply into pros and cons would occupy too much space.

So I am just going to take a broad survey of the present position of things.

Firstly, we have to face the fact that we are in a business which, like most other businesses, has collected about itself certain customs which our customers are used to and understand; one of those customs is the square inch rate of charging. Now, I am going to ask which is likely to prove the most commercially successful method—to plan our methods of production so as to supply work according to custom, or endeavor to upset custom to suit our methods of production, remembering that the buyer is the man possessing the custom which we have to try and upset? I maintain that the first system is the better of the two, providing it is possible to work it satisfactorily. It is quite possible to work it satisfactorily, and I am here going to make a terrible statement, and that is ("slow music, please"), that the square inch method of charging is a perfectly satisfactory one for both tone and line work—perfectly satisfactory and simple as far as the buyer is concerned, and equally satisfactory from the producer's standpoint providing their works are organised to suit it. The trouble lies, not in the method used for charging, but in the slipshod, rotten organisation of the bulk of the photo-engraving shops on both sides of the water. As far as I am concerned I wish for no better method of charging for work than by the square inch method, and I will go so far as to say that, if necessary, I should be prepared to even charge artists' work on the same lines, and have a method already formulated for so doing if necessity arises.

As regards Mr. Benedict's figuring in connection with his 1000 cuts containing 15,000 square inches, I ask him, would any sane firm allow an operator to take through twenty 10-inch copies, each on separate negatives? But why does he take the 10-inch copies; why does he not take the 1 × 1 copies he mentions, and take through these separately? The result would be far more absurd, and show such a much bigger difference in costs. We all know from experience that if we have a quantity of copies together, many of them can be copied together, and thereby get our small copies made up into large plates right from the start. Perhaps Mr. Benedict will retort by saying, Suppose they won't copy together? Well, if they won't, all I can say is that they would be a most unusual lot, and the risk of having such a lot sent in would be very remote, and one that we should be prepared to take as an ordinary business risk and have reserves to meet such contingencies.

As regards the increased waste of materials when small work is being handled, I contend that if small work is handled properly the increased wastage of materials is nothing as compared with the increased risk of absolute loss resulting from occasional spoils and rejection of large plates; and for this reason alone, if there were not others, in my opinion it is a sufficient reason why a reduction of any definite nature should not be made in the price per inch of large work.

Mr. Benedict says that 90 per cent. of the blocks that go through are of less size than 30 square inches. As far as the English trade is concerned, I should rather put the size at less than 20 square inches; and further, say that there are many houses whose average size per block of their total output of half-tone is less than 20 square inches. That being so, why not, as I suggest, base our costs on what we do, not what we hope to enforce our customers to order? By raising the price of our small blocks and lowering the price of large blocks, we shall never compel our customers to use large blocks if they don't want them; but we can easily by such tactics make the small blocks a far too expensive article for them to use at all, and they will either do without illustrations or make use of some other method; therefore, as the prices for small work are all right taken on the whole, and are such, if the work is properly handled, as will yield to the blockmaker a very reasonable profit for his labors, why try to interfere with them?

Why try to introduce a complicated method of charging which will tend to aggravate our customers? Is it not better for us to set about our own internal organisations and devise means whereby we can supply the right thing at the right market price, in such a manner that we can make the right profit out of it? It is to be done, and is done, and done in such a way that those employed work under better conditions and get better money for their labours than they could do in the shops where there is so much squealing about cut prices.

Photo-engravers have got to face the music of present prices; they will not go up to any extent if at all. I do not of course refer here to a few isolated cases where prices are quoted which are absurdly low.

Therefore the sooner every firm tackles their productive costs in a proper manner, the sooner they will realise their exact position. Use Mr. Benedict's system, or my system, or any other system they please; what I say is get, at costs, "accurate costs." Be sure they are accurate; there are many ways of doing it; some are better than others.

Let me add just a few words on sliding-scale charging. It is, on paper, theoretically correct, but in practice is no good at all. I went over the whole ground some years ago, exactly on similar lines that Mr. Benedict is working now, and went so far as to print price lists and work, or try to work, the system. It was a failure; and there are many reasons for its failure. It's a case of what you make on the swings you more than lose on the roundabouts.—With the compliments of the season to all, I remain, yours truly,

ARTHUR COX.

P.S. — Cannot some other shadow merchant come forward and give us his views on costing, etc.? Why only have one on each side the herring-pond?

[It is evident that the point at issue between our two correspondents is not that of theoretical or scientific accuracy but one of expediency and commercial practicability, and this obviously must chiefly depend on the disposition of the photo-engraver's customers. It is conceivable that a system which would be perfectly practicable in America would spell disaster among British customers, who, as Mr. Arthur Cox points out, are not easy to move from a practice of charging to which they have been accustomed for years past. The moral of the foregoing correspondence seems to us to be the value of having a system of some kind provided that the information given by it is commercially right.—ED., *Process Engraver's Monthly*.]

"Valentines."

CLIFTON S. WADY writes thus about valentines. It is his contribution to the discussion on "Cost and Selling Price":—

Last year I had some Valentines
Marked "overdue" and "please remit,"
And tho' they promptly came to hand
I didn't like them—not a bit!

With dignity each one I tore,
And threw the pieces on the floor;
I managed, too, to hold my peace,
But swore to bring about release
From thraldom of this abject kind
If I a way could only find.

I found the way: *
And hence to-day
Such Valentines don't come my way.
I sell good work and get the price,
And patrons call my product nice.

And better still,
They have the will
To help me discount ev'ry bill.

. . . . .

Who hates a dunning "Valentine"
May profit by this hint of mine.

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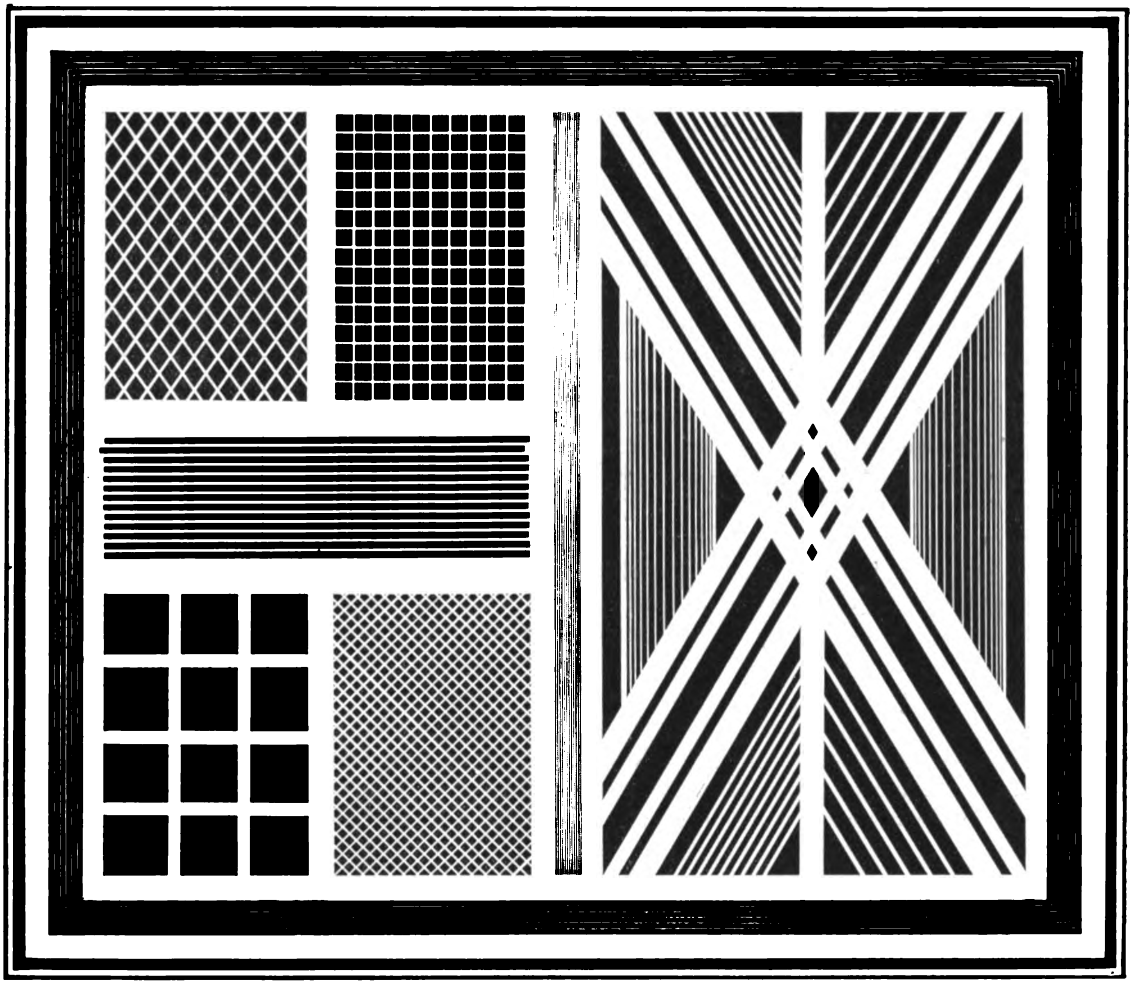
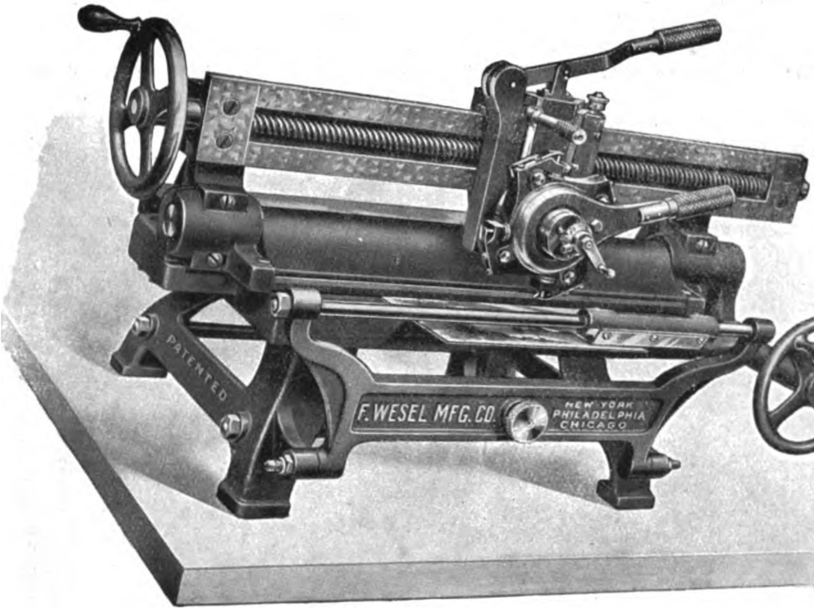
* I charged "more" for work that was worth more; and refused work that was worth less (worthless) to me.



✓
Wesel Lining Machine.

We illustrate on this and page 45 the new bench pattern lining machine handled in this country by Hunters, Ltd., Poppin's Court, Fleet Street, and also a specimen of some of the work that it will do. It is possible with this machine to line work on any part of the plate, the machine being operated by hand, with the work in sight all the time; by varying the gravers any number of lines, of any width, can be cut. The gravers are held in a tool post which is actuated by a worm screw giving a positive movement; the tool post is adjustable in all directions, and has a lateral movement controlled by a micrometer gauge, so that when the plate is secured, parallel lines, spaced as desired, can be cut without moving the plate, simply by regulating the tool post. The machine is made in two sizes, viz. to line 16-inch and 24-inch plates respectively. The machine can be seen at the show-rooms of Hunters, Ltd.



Brevities.

"Blue Ribbon Cut-makers" is one of the catch phrases used in their advertisement by the Central Engraving Co. of Cleveland, Ohio.

The address given in our last issue of C. R. Harker, Stagg & Morgan, Ltd., manufacturing chemists who specialise for the process trade, should have been Devon Wharf, Emmott Street, Mile End, London, E.C.

"If you buy mushrooms and they kill you, they are toadstools." — This catchy head-line is used by the Queen City Printing Ink Co. to warn the readers of its advertisements against the "just as good" printing inks. Cut-price contracts run into big money and look like fine mushrooms. Often they are toadstools of the most deadly type.

"Camera versus Comp."—Fifteen years ago we discussed the possibilities of producing newspapers and books by typewriting the matter and producing the printing plates by photo-process. This method has actually been used in the production of two newspapers in Cleveland, Ohio, a few weeks ago, during a strike of the compositors.

Newspaper column half-tones at 50 cents. each is the special line offered by one of the price-cutting American concerns, and we are glad to see that *The American Printer*, in criticising their circular and offer, points out plainly that no one can do column half-tones at this price for a profit; and further, that it is quite unnecessary, "for people whose trade is worth having are willing to pay a fair price for what they get."

"We don't quote in advance."—This is the motto of one of the successful modern American printing offices. It argues that a printer who is honest should charge a fair profit on every job, and will not charge an unfair profit on any job. Further, that if a customer has not confidence in the honesty and ability of his printer, he ought not to trade with him. Therefore, it absolutely refuses to give a price until the job has been finished, when the price consists of the actual cost of the work and materials, *plus* a fixed percentage of profit. This idea may possibly be helpful to some photo-engravers. In many cases where they give an estimate at a fixed per-inch price without knowing the nature or quantity of the work, the whole thing is very much like guessing, and the profit is a matter of uncertainty.

Hunters, Ltd., send us a sample book of their new stereotype papers. These tissues are of long fibre, free from pinholes, and contain a percentage of asbestos to prevent the "matts" from burning. Messrs Hunters, Ltd., will be pleased to send a sample book of these tissues and also a sample of their Stereotyper's Paste Powder, which is used in many of the leading newspaper houses, to anyone who is interested.

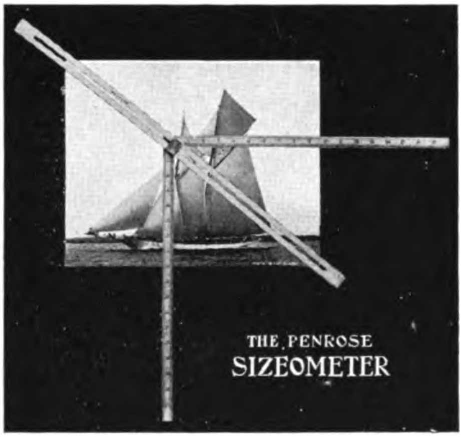
The Penrose Process Pocket Book and Diary for 1909 is as usual full of practical notes and formulæ, providing the process worker with a means of reference for every class of reproduction work. This little process encyclopedian carries as well a £1000 insurance coupon. It is compiled, as before, by Mr. Wm. Gamble, with many useful tables by Mr. J. A. C. Branfill. The price of the book to non-customers is 1s. 6d.

Hunters, Ltd., are sending to all process engravers their Pocket Diary for 1909. A marked improvement over the last issue is at once noticed, the diary being bound in handsome leather with only the H. L. trade mark neatly stamped in gold on the front, giving it quiet yet effective appearance. It contains, besides the diary, much information and formulæ for photo-engravers, as well as a few advertisements of the Hunter specialties.

Baxter Color Prints. — Two hanging calendars that reach us from J. M. Kronheim & Co., printers and embossers, 109 Hamilton House, Bishopsgate Street Without, are of more than usual interest, as the illustration consists of a Baxter color print printed from the original blocks that were used over forty years ago. The back of the calendar is of almost equal interest, as there in letterpress is an article "George Baxter: his Work and Method," from the pen of Frank Colebrook.

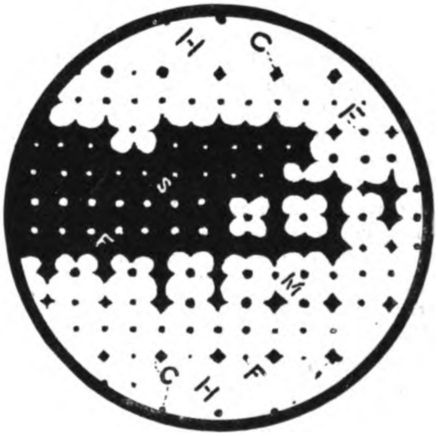
John Royle & Sons of Patterson, N.J., U.S.A., send us a neat little pocket diary containing much useful matter for all those doing business in or with America. One of the prominent features is the inclusion of 12 pages of maps, making a handy reference atlas for those having American interests. The whole make-up exemplifies what the firm says in the few pages of forewords anent themselves, that from the beginning the Royles hung up as the guiding star of their enterprise, "Not how cheap, but how good."

Penrose's Sizeometer Rule is another useful appliance for facilitating the office work of anyone who has to estimate for process blocks. It shows at a glance the proportionate height or width of any original marked for a given lineal reduction. When opened, the rule stops at the right angle, whilst the diagonal rule can be made to slide by means of its slot, so as to get the best position according to size of the subject. In using, the diagonal rule is placed so that the corners of the picture can be seen through the slot, then slide the angular rules up or down until one of the arms measures the height or width desired. On the other arm will then be found the required measurement of the second dimension. When closed up the instrument is compact and goes into a neat cardboard case. Its cost is 6s. 6d., and may be obtained divided into either inches or centimeters.



The Wratten Tri-color Ink-Tester.— Messrs. Wratten's filters and plates having become so largely used by process workers, the introduction of this piece of apparatus should be welcomed. Messrs. Wratten in a booklet, which they offer free to any photo-engraver, explain that the ink-tester is issued in order that photo-engravers may easily obtain information as to the suitability of the inks which they are using, and thus be saved from attaching blame in a wrong quarter. The way in which the ink-tester is used, will be understood when it is pointed out that it consists of two sets of transparent patches, one those of the standard Wratten tri-color filters and the other the complementaries of those colors, that is to say, the printing colors. Thus it will be understood that when examined through the red filter of the No. 1 series, the blue ink should appear quite black, the red ink very light, and the yellow ink almost invisible against white paper. The instructions for the use of the ink-tester are given at considerable length and supply indications of the defects to which commercial inks are most liable. The results are put forward, not as an exhaustive test of an ink, but as a means of enabling the practical worker to form a judgment of an ink in a far better way than by the eye alone. It will be understood that the ink-tester is thus a further step towards a method of three-color block-making in which the human intervention is reduced as far as possible. The results obtained at the L.C.C. School of Photo-engraving at Bolt Court, and in various commercial firms, have shown the surprisingly good results to be obtained from a set of three-color blocks which have been simply flat-etched. A suitable choice of filter and ink has rendered unnecessary much of the labor of the fine-etcher, and the introduction of a ready means, such as the ink tester supplies, of quickly obtaining a fairly correct notion of the working qualities of an ink should be a further aid in this desirable direction. The ink-tester is supplied by Messrs Hunters, Ltd., at a price of 5s.

TWO-SCREEN HALF-TONE.—In December we illustrated the two screens recommended by Carl Richter for making newspaper half-tones. Below is a diagram showing the effect of using these screens. The illustration is from the *Centralblatt für Photochemigraphie*, which says that "The one real difficulty in the production of newspaper half-tones on the present basis is the holding of detail in the shadows. To overcome this difficulty, the Richter process utilises a screen for the details, and another screen effect superposed over the first, which will give strength of contrast and purity of high-lights that is unattainable when one screen only is used. It is necessary that the series of dots formed through the screen openings of the coarse screen will register exactly with the effects of the finer screen, the coarse screen having half the number of lines that are found on the fine screen. The effect is quite startling, for the shadows are very soft, being composed of white dots in harmony with the fine screen, and the high-lights are formed with very open dots that harmonise with the lines of the coarse screen. In the middle tones there are formed large black dots due to the coarse screen, and small black dots lying between the large ones formed by the fine screen. This gives the effect of a series of definite black cross-lines in the middle tones, which are more open than the usual dots. These conditions greatly improve the printing quality of the plates, for the contrast is held without losing shadow detail. The difference is quite marked when illustrations made with the old and the new process are placed side by side. Where the two screen effects are combined—in the grays—the coarse dots coincide in position with the same number of fine dots, and in addition have between them a second set of fine dots. The first set of fine dots are lost through occupying the same space as the dots held by the coarse screen. The illustration shows the relation of dots, H representing the high-lights, S the shadows, and M the middle tones. The dots of the fine screen are identified by the letter F and those of the coarse screen by C."



School Notes.

THE BOLT COURT LECTURES.—Feb. 4th, A. G. Symmons (of Messrs. Alf. Cooke, Ltd.): "Application of Photography to Lithography, including the Bitumen Grain Process"; Feb. 11th, Colonel G. N. Grant (of Ordnance Survey Department): "The Production of Ordnance Survey Maps"; Feb. 18th, A. J. Rowley (Secretary of the Paint and Varnish Society): "Oils, Colors, and Varnishes in their relation to Lithographic Tin and Offset Printing"; Feb. 25th, C. I. Smyth (of Messrs. Mander Bros.): "Color Inks."

Bolt Court School.—The annual supper of this flourishing school took place on December 19th in their own "art room," which was crowded with men and youths, past and present students, and many distinguished guests. Heartiness was the order of the evening, as it always is at these functions, and the unceremonious manners of the students seem to increase the enjoyment of the big guns at the cross table. The speakers were Sir George Frampton, R.A , who presided; Messrs. A. J. Newton and Cecil Rea, vice-chairmen; Dr. Wm. Garnett, secretary of the Education Committee, who gave a most succinct account of the development of art teaching; Dr. C. W. Kimmins; M. Nelson Dawson, Frank Colebrook, and A. B. Sullivan. A varied entertainment followed the distribution of prizes. A badge of silver, presented by the chairman, was won by Mr. Barber for the best work of the year. Drawings and sketches of a very high order of merit lined the walls, and evinced, not only technical and academic skill, but fine imaginative and romantic feeling, remarkable as coming from London boys trained in a little court off Fleet Street.

Correspondence.

THE NEW FOUR-COLOR PROCESS.

To the Editor, "The Process Monthly."

Dear Sir,—I am sorry to again trouble you on the above subject, but Mr. Zander evidently misunderstands the principle of the new process and leaves me no alternative.

I take it that two pigments are complementary when they produce black, that is, when they absorb the whole of the spectrum, practically as shown in Mr. Zander's diagram. Now I can but repeat that no two pigments that I employ are complementary, that is to say, no two pigments that I employ will produce black. They are not required to do so. The absorption bands are too short, and the principle involved will not permit it.

For instance, if we form a light-filter of the eosine red and one of the Mollins patent blue (sulphate of copper solution blue) and superpose, we do not get black. If we examine the spectrum we find that yellow and violet light pass practically undiminished. Herein lies the difference in the principle of the two processes. Now if my green-blue is Mr. Zander's green, and my red is his magenta, then all I have to say is, form two filters as before, but of green and magenta; superpose, and note the difference. This time we do get black. The whole spectrum is absorbed, for the two filters are complementary. In short, the new four colors produce black once; Mr. Zander's four colors produce black twice. Personally, I think black once produced is quite sufficient.

The liberal amount of credit that Mr. Zander is willing to place to my account (and to his own) is very satisfying, but is not required. If he fails to understand the principle of the new method, I fail to see how he can judge the value thereof.

As before stated, the new process is really that of the three-color process, but with the magenta divided into two, neutral red and neutral violet. Magenta, then, being red + violet, and the spectrum-red of the three-color process being composed of magenta + yellow, it follows that a similar spectrum-red in the new process is red + violet + yellow, that is, for a saturated color. For lighter tints the violet and yellow become weaker and weaker until red alone is left. Then the red itself undergoes the change. It is thus seen that spectrum red may be represented by red alone or by red + yellow + violet. The addition of violet and yellow gives *body* to the color; the shading is produced by blue. Other colors can be traced, but I am afraid I have already occupied too much space, and sufficient has been said to show the new principle involved.

I would just like to say that the selection of the four colors is supported theoretically by the spectrum thus:—If we form a rough spectroscope by making a slit in the window-shutter, and viewing the slit through an ordinary triangular prism, we see the seven colors of Newton. If we considerably widen the slit we have the red, green, and violet of Young-Helmholtz If we again widen the opening, the spectrum is divided into two parts by a band of white light, the green has disappeared, and the colors now displayed are red and yellow, blue and violet. These four colors are the colors of the new process. If we overlap the yellow and blue in this spectrum we get green, and then we have the red, green, and violet of the synthetic method of photography. If, instead of this, we overlap the red and violet we get the yellow, magenta, and blue of the subtractive method.—Yours faithfully, Geo. Woodiwiss.

Estab. Jan. 1894.
" The Process
Photogram "

THE PROCESS ENGRAVER'S MONTHLY
THE PROCESS PHOTOGRAM — ESTABLISHED JAN 1894

VOL. XVI. No. 183.
MARCH 1909.

Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly*.

✓ *The Winstanley Half-tone Process.*

By Edmund Passingham.

(Continued from p. 31.)

LOCKING UP THE NEEDLES IN A CHASE.—I have often wondered if Mr. Winstanley would have done the same as I did without thinking what sort of chase would be required. I started with one with smooth sides and inserted the needles in it. No one can have any idea what a job this is until they come to try it. I then pressed them on to the relief and locked them up, with the result that when they were taken off the relief hundreds fell out. I then found that I should have to make on two sides of the chase a groove at every alternate row; see patent No. 29,924 A.D. 1896, which says:—

> In order to obtain the regular distribution of the wires necessary to enable the mass of wires to be securely locked up to permit of obtaining a matrix therefrom, and to ensure the ultimate production of a regular stippled effect which will render by its gradations all the half-tones and shadows of the subject, it is necessary that the wires be arranged in quincunx order so as to form perfectly regular horizontal, vertical, and diagonal rows throughout the mass. Any deviation from absolute regularity will not only impair the regularity of the stipple but will prevent the equal distribution of pressure when the wires are locked up, with the result that some at least of the wires will become displaced or fall out, thus rendering the whole mass useless. As it is impossible, owing to the immense number of wires requisite for even a small block, to arrange them positively in the required order, it is necessary to provide means whereby the wires shall be constrained to assume their proper positions in the act of imposing and locking up the mass.
>
> The object of this invention is to ensure the regular arrangement of the wires and the equal distribution of the pressure required to ensure the maintenance of the wires in place.

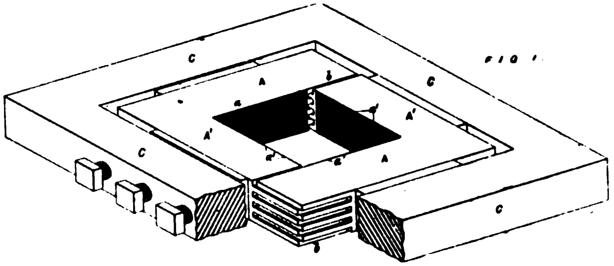
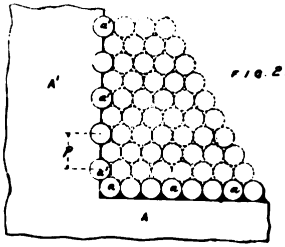


Fig. 1 represents a perspective view of a chase, and fig. 2 a view of one corner thereof drawn to a highly magnified scale and adapted for the purpose of ensuring the necessary arrangement of the wires whilst imposing, and holding them securely when locked up.



This is accomplished by lining the inner faces of each of two opposite sides A A of the chase or frame with a row of wires *a* identical in all respects with those of which the photo-relief counterpart is to be made, except that they are unpointed, these wires *a* being closely juxtaposed and permanently secured to the wall of the chase by soldering. The other two sides A^1 A^1 of the chase are similarly lined with wires a^1 not closely juxtaposed, but spaced at a pitch which bears a certain known proportion to the diameter of the wires, so that the positions they occupy will be such that they will, so to speak, form the terminal wires of diagonal rows of wires, and consequently of alternate horizontal rows of wires when the chase is filled. To enable this spacing of the wires a^1 to be regularly obtained, the side wall of the chase is accurately grooved by means of a dividing engine, with grooves of semi-circular section, the said grooves being spaced at the proper pitch, which is ascertained by the formula $p=d\sqrt{3}$: p being the pitch and d the diameter of the wire. The grooves extend the whole height of the sides A^1 of the chase, and in these grooves the wires a^1 are received to a depth of half their diameter and are permanently secured therein by cement. The outermost wires at all four sides of the chase being thus fixed in predetermined positions, it follows that in filling the chase with loose wires, and locking it up after imposing on the photo-relief surface, the loose wires next to the fixed ones are constrained to assume their proper positions, and in turn determine the positions of the next adjacent loose wires, and so on, whereby the orderly arrangement and secure locking up of the whole mass of loose wires comprised within the chase is ensured.

The chase illustrated is supposed to be rectangular in form with its side members arranged in pairs, each pair comprising two adjacent members rigidly connected together with their inner faces at right angles to one another, and their free ends, which thus meet at diagonally opposite corners, being tongued together as indicated at *b b* to permit of the contraction about the mass of wires necessary for locking them up. Any suitable method (such, for example, as wedging up within an outer chase C as indicated in fig. 1) may be employed for tightening up and securing the members of the chase.

The illustration, fig. 2, shows this. After this had been done and I came to insert the needles again, still they could not be made to go into their proper formation, that is, row upon row lying in one another.

It was not until I had securely fastened a row of needles side by side on the other two sides of the chase that I was able to get them into their proper formation. This time when I came to lock them up, not a single needle fell out; in fact, they were like a solid mass of steel. It was a long and tedious operation to pack them, and was most painful to the eyes.

Before leaving this part of the process I may say the chase has to be made true in every direction, the dividing must be calculated to the 10,000th part of an inch, and every needle must be straight; a single bent one is sufficient to upset the "formation." The locking-up frame must be very powerful to withstand the pressure of moulding.

MOULDING.—Of all the difficulties up to this time, this was really the worst. At one time I thought there was no road out of it, and it was only by dogged obstinate perseverance that I was at last able to obtain a successful mould.

This is what confronts one: suppose a chase of needles contains 50,000, which is small, about the number used in the illustration in the January issue, there are the same number of holes running through them. When one comes to mould them in the ordinary press, the displaced wax rises into these holes, with the result that on trying to remove the chase from the matrix it will pull it from the box; the wax has to be melted from the needles, and it is not easy to clean them again.

If a small tube is filled with the needles it is impossible to get an impression from them with hot sealing wax; the cold points of the needles carry the wax down and no impression is made.

A special press has to be made, one that registers; that is, one in which an impression can be taken again and again on the same matrix. The moulding box is fastened to the lower bed, and the chase to the upper one, which is hinged much upon the same principle as the platen in a printing machine. This upper bed is brought down and locked, and the under bed screwed up to the chase.

TO PREPARE THE MATRIX. — Any good moulding wax such as the electrotypers use will do; the same precautions have to be taken to prevent side-slipping as in moulding process blocks, also the same temperature has to be observed. The matrix is freely black-leaded, and a substratum of the thinnest tinfoil is laid over it. A squeeze is then given, about half what is finally required, and on releasing the chase it will be found the tin will leave the needles and the matrix; this last is again freely black-leaded and the pressure has to be increased until the base of the needles, representing the high lights, is reached. On again releasing the chase it will be found the tinfoil has left the mould but has adhered most tenaciously to the needles, so much so that not a single bit can be caught hold of with the aid of a sewing needle; one would think the foil had been soldered on. How to get this off was a conundrum. Heat was tried to see if expansion would release it—this was no use; but, like Columbus and the egg, it is easy when you know how. The tinfoil is slightly heated and then brushed over with a little benzoline, when it will come away with a perfect impression of the needles, and by transmitted light has the appearance of a transparency from the original.

The needles are finally brushed to get rid of the benzoline, and another pressure given to counteract the thickness of the foil.

GRINDING THE ELECTRO. — There are many ways to do this.

In conclusion, I wish to draw attention to the illustration. This was made long before I found that absolute accuracy had to be observed from beginning to end. The print shows fairly good results, considering under what conditions it was produced. In the first place, it was made from a stripped relief. The needles are anything but one length, numbers of them have not reached the relief. The conical points vary thoughout the mass, as much as ·0006 more than they should do. And lastly there are the faulty holes in the centre of the dot. At any rate the prints show that the needles can be locked up perfectly and that a successful mould can be taken from them.

Owing to the shape of the points the block should outlast any made from the screen process. An engraver could do much as he liked with the high lights.

[⁂ We are very glad to be able to put on record Mr. Passingham's extremely ingenious and painstaking methods of overcoming the difficulties of a most interesting process. It may be that some day it will have its practical uses, for the resulting blocks have certain physical characteristics which are different from those of blocks made by all other processes, and which offer advantages in printing.

At the same time, we would emphasise Mr. Winstanley's own suggestion, that in trying to make needles he had been wrong, and that type-bodies with pyramidal heads were the real keys to the problem. The next investigator who takes up the method might at least consider the possibilities of square or hexagonal columns, made as type is made, by casting.—ED.]

✓ # *Machine Photogravure.**

By George S. Barlow.

From *The Inland Printer.*

WITH the invention of machine photogravure we have a revolution in the art of printing which bears the same relation to plate-printing that the steam press does to the hand press, and which gives the perfection of photogravure, combined with the advantage of the cheaper letterpress, or typographic printing, so that the production of photogravure in large quantities is no longer slow and expensive.

Since first the Rembrandt Intaglio Company, of London, England, about twelve years ago, put upon the market its famous photogravure prints there have been numerous attempts made to imitate them, with more or less success, both in this country and abroad. It may therefore be well to mention that this process, which in England is still regarded a "secret process," could hardly claim "patent rights," although there are on file in the records of the Patent Office several processes that might produce very much the same results. In fact, this new process has so many varieties that any capable man in this line would find it easy to slightly modify the operations, and thereby lay claim to a new process.

In the perfection of this new method of intaglio printing, it is made possible to reproduce art subjects and fine illustrations to compete in price with typographic half-tone. Being well adapted for producing mezzotint effects and linework, it is also unequalled for fine printing on fabrics; and for the manufacturing of fancy papers, made in imitation of plaid and cloth designs, leather, wood and marble, with perfect photographic effect, true to original, at less than one-half the present cost of production. The possibilities of rapid photogravure are so tempting that it seems strange indeed why this most artistic and beautiful of all photo-mechanical processes has not met with more rapid success.

It is my aim here to briefly give ideas, based upon personal experience of several years' practice with machine photogravure, that may be of interest, if not a help, to those who at present are experimenting in this direction; and to others who may wish to take up this work in the future.

The following example will give some idea of the commercial value of this new printing process, which, in the hands of a practical man, might reasonably be accomplished. In a few hours the writer has engraved a copper roller 30 by 18 inches, with six designs, magazine size, which when adjusted in a rotary press making two thousand impressions per hour, would yield about one hundred thousand photogravure prints per day (this is more than one hundred times quicker than plate-printing); these selling at the low price of $4 (16s. 8d.) per thousand would represent quite a handsome daily profit. The printing, which is done from engraved copper rollers, preferably from the web, on almost any kind of paper, means a great saving on the paper-stock.

The cost of making the engravings is another item of economy which, compared with half-tone, presents the following important advantages: The use of the original negative, or positive transparency, without half-tone, transfer, or reversal of the image, no tooling or handwork on the plate required, no blocking of cuts, no make-ready—and the labor of washing up as in half-tone is here dispensed with. The engraved copper rolls or plates, as soon as etched and cleaned, are ready at once for printing.

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* The text-book on this subject is *Photo-Aquatint and Photogravure*, by Thomas Huson, R.I., R.E. Price 2s.

The cost to instal a plant for doing this work—one machine—everything new, need not exceed $2000 (£400). One of my first experiments with this process was made on an old, incomplete calico machine taken from the scrap-heap, and with it made saleable prints. There are other styles of rotary presses which could be made suitable for this kind of printing, and I have good reason to believe that a machine will soon be put on the market built especially for this new process, after the pattern of the sanitary wall-paper or pottery printing machine, supplied with the special hard rubber coating on the drum, complete and ready for sale, at a price considerably less than $1000 (£200). Much experimenting and capital have already been spent to help bring this process to a practical issue, and it will not be many days now before rapid photogravure made in this country will compare favorably with that produced abroad, but so far, hardly more than enough has been done to prove the uncertainty of the process in the hands of the novice; for, like other good things, "rapid photogravure" has its difficulties requiring the care and skill of the expert to overcome. For those who may not be familiar with the principle of the calico machine as applied to this process, a brief outline is given. A large iron drum, covered with suitable rubber surface, is brought to bear against the engraved copper roller; between these two rolls passes the paper to be printed. The rubber-covered drum, by pressure, forces the paper to pick up the ink from the recesses of the engraved roller, which, being supplied with ink from the trough beneath, has also its surface automatically kept clean at every revolution by the use of a steel scraper called "the doctor," which must have its fine, sharp, clean edge so truly adjusted to the copper roller that the prints will be clean, otherwise the doctor cannot wipe the roller perfectly and prints will be degraded. A little experience will soon enable the operator to secure just that right pressure of the steel wiper against the copper roller to avoid unnecessary friction and consequent rapid wearing of the engravings; to have just pressure enough to wipe the engravings clean, which being done in the fraction of a second, insures the life of the roller, and increases its service over six times that of the hand-wiped plate.

Special attention must also be given to the making and use of the ink, which should be made for this particular work, and filtered through fine cloth to free it from grit which might easily scratch the copper roller. The ink should be about the consistency of ordinary paint, with a goodly amount of turpentine and magnesia, and just enough special drying oil to fix the colors and dry quickly; modified of course to suit both the quality of paper and style of printing. To print to imitate wood requires an ink that will slightly stain the thin paper, which is all done in the one printing.

If we examine closely under the glass the Rembrandt prints, we recognise at once the old familiar cross-line screen, this being used, in place of the resin grain, in the old photogravure style, and gives the plate its ink-holding properties.

In place of this grain, we have in the screen-photogravure a soft, fine dot, no more visible to the eye than is the dot of the grain-photogravure ; but which, having so many dots all of one size to the square inch, makes possible the production of a perfect intaglio printing-plate, mechanically, on which there is absolutely no handwork required. This, then, is certainly a great improvement, for such finished printing-plate cannot be obtained direct when using the graining box; furthermore, plates by this process are made in half the time, are easier to print, and last longer; they can also be used in the copperplate press in the usual way, or wiped by hand with the steel scraper with economy and the best results.

The screen generally used for this work is the 150 cross-line. It is not the regular half-tone as is generally supposed, but one made in reverse to it, having black dots instead of black lines, and the most practical and successful way of using it is in connection with the carbon or autotype method of photogravure; the direct or deposit method being entirely out of the question in so far as the etching and printing from direct copper rolls are concerned.

When using the carbon method, exposure to sun or a fixed focal light by contact in the printing frame is to be preferred, and by combining the two exposures on the one piece of carbon tissue, first through the screen, then the transparency, you form the carbon resist about to be etched upon the copper, and in that resist can also be seen the small spaces, made by exposure through the screen, exposing the copper to the etching solution in true gradation that when etched should have the capacity for holding enough ink to give full depth of tone in printing, and yield the soft quality of dot desired.

Of course all this means that at every step of the process things must be right —that is, the negative, transparency, exposure, resist, temperature, etching solution, inking, contact and action of press, must all be adapted to each other.

The main point, however, is to get into the transparency all the qualities desired in the final print, with correct gradations and full tone values; and it is better to get this quality in the transparency than to try and correct the error in the etching or by any subsequent handwork on the plate. Then, having made from it an exact replica of resist, corresponding in reverse, it follows that the etching solution being constant and of the proper strength to maintain the full range of tone all the way through the etching to the thickest parts of the resist or high-lights, the result will be a certainty. Yet, if the resist is not just what it should be, you may manipulate with a number of etching solutions of different strengths, so as to increase or diminish the action and time of etching, and alter thereby the absorbing qualities of the resist to balance the qualities it lacks. Even this mode of etching, which is not the safest, should be as easily managed as in developing a good quality negative. But a thorough knowledge of all the peculiarities of the carbon process is absolutely essential, and although this too is a very simple process, it requires considerable experience and the closest application to detail and system before any degree of success can be assured.

Aluminium in Metallography.*

We have thought it useful by reason of the increasing application of aluminium to photo-mechanical processes to abstract under the above title the series of articles published by M. Paul Robert in the *Bulletin of the Union of Master Printers of France.*

INTRODUCTION.—How does aluminium compare with stone? That is the key to what can be called the secret of metallographic printing. Stone is porous, aluminium is not porous. The essential problems of preparation, inking, damping, and graining proceed from these facts.

The difference between metal and stone as regards porosity should be considered as the cause of all failures. It was at first thought that using with metal the theories and methods used with stone would be the surest means of obtaining the wished-for lithographic results; this led into a path full of errors, and the difficulties encountered soon showed the falsity of the ideas adopted. One experience can, among several, prove this.

All lithographers know that on a prepared stone, soap and printing ink act without opposition; and they leave traces on the acidulated surface of the stone as much as if the stone had not been treated; thanks to its porosity, these two substances are allowed to penetrate it. On the contrary, over the surface of the prepared aluminium plate pour lithographic ink or rub soap, and it will soon be seen the two supports are not at all alike; there will, in fact, be left on the metal no trace of grease, the effect of the preparation preventing the least contact.

GRAINING.—The metal should be grained to be used for printing purposes; the grain replaces on the non-porous metal the porousness of stone. It forms on the surface of the metal millions of microscopic cells in which the damping water is enclosed. It also allows, by its physical texture, the closest adherence to the metal of the ink and the preparation which by turns are placed there. If we remove the grain, the ink, the preparation, and the damping water can find no more resting-place than on smooth glass. Ungrained metal is not useful for printing; metal properly grained is of the greatest use. To know how to select the grain best adapted for a given ink is of the greatest importance.

GRAIN AND INK.—Work requiring slight inking, and therefore as little wetting as possible, demands a very fine grain, the extremely small cells thus reducing the amount of moisture. Work requiring heavy inking and abundant wetting can only be properly done on medium or coarsely grained metal.

A little practice will suffice to gain the necessary judgment in choosing; too fine a grain would cause the high-lights and half-tones to be lost by defective damping, too coarse a grain would prevent the prints showing the full inking. All grainings may be obtained by grinding with pumice powder more or less finely sifted, and the grain should be carefully observed with a microscope, or, at least, a counting-glass; the work will thus be done by rule.

THE PREPARATION.—Nitric acid has no effect on aluminium. The preparation should be composed of—

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* Translated from *Le Procédé.*

Solution of gum water at 10° Beaumé - - - 1 litre.
Phosphoric acid (syrup) at 45° Beaumé - - - 30 c.cs.

The gum water must be brought to the desired fluidity, guided by the markings of a Beaumé hydrometer (for testing acids), which should indicate 10° to 20° or near that, to show the fluidity of glycerine. If thicker, it will spread badly; if thinner, its action will be insufficient.

The principal use of the gum is to localise the action of the phosphoric acid. If the acid solution has no gum, the outlines of the design would not be clearly defined, by reason of which the ink sufficient at the time of preparation will drive away the water and the acid it contains. There will then be all around the design an unprepared zone, formed by the thick halo of the ink refusing and repelling the water. On the contrary, with a proper admixture of gum, the solution is retained to the edges of the design, and allows the phosphoric acid to bite into the metal in every part. This chemical action of acid on metal is very simple; aluminium untouched is able to retain greasy ink. When the design is laid down, we wish this same aluminium to repel the thick ink beyond the edges. The phosphoric acid forms with the metal a salt insoluble in water, an essential property which prevents its dissolving during the constant damping of the plate; and during the printing the inked rollers pass over a salt of aluminium *absolutely repellent to greasy* bodies. All metallographic preparations obey the same principle. Suppose that some day we wish to print from copper or silver, we have only, in order to find the proper preparation, to obtain acids able to form with these metals salts insoluble in water. The rest is only a question of measuring, easy to determine. "Greasing," of which many lithographers complain, has very often no other cause than the bad quality of the preparation used. The salts formed, in spite of all rules of chemistry, are partly soluble in water, and the plate is found unprepared after a few passings under the dampers. Why is it surprising that this plate should be greasy? As indicated below, the gum solution and phosphoric acid constitute the preparation for transfers. When it is necessary to prepare for originals in pen or pencil, we will see that it is required to reduce by half the strength in phosphoric acid.

Solution of gum water at 12° B-1 litre
Phosphoric acid (syrup) at 45 B°-15 c.c.

Great care should be taken in all metallographic preparations, and when there is any trouble with metal one must not rest without ascertaining what caused the difficulty. More care is needed for aluminium than for stone, because of the difference in measuring the preparing acids demanded by the two supports.

For stone, the preparation contains a minimum of 30 per cent. of acid, for aluminium the greatest amount is about 3 per cent., fully ten times less, which means that the preparation for aluminium is ten times less corrosive than the one for stone. Marks made on stone by finger contact or by a blouse soiled with ink or lithographic chalk will be found burned by acid used, while the small amount used in preparing aluminium will not penetrate.

TRANSFERS ON ALUMINIUM.—All the transfer papers commonly used with stone can be used with aluminium. We specially recommend the damp transfer (hydrochine) as giving best results. This paper does not demand any damping of the plate, always a delicate operation. Whatever paper is used, the prints should be well nourished with transfer ink. There is no excuse to fear the spreading which is inevitably produced on stone with proofs pulled under these conditions. The grain on the surface of the metal forms millions of microscopic cells in which the ink easily lodges when the same quantity would spread over the surface of the stone. The grain of the metal causes a separation of the ink from the transfer, which, on one hand, is opposed to the running over, but, on the other hand, demands a sufficient reserve of ink to ensure the complete covering of the grain. It goes without saying that the proofs should not lose in sharpness what they gain in inking, whence the necessity of using a very stiff ink capable of piling up well. We recommend the important precaution of keeping the temperature at about 16° C. (60–65° Fahr.) when making transfers.

CHALK WORK is done as on stone, but with an alteration not to be neglected with transfer papers requiring a previous damping of the plate. Damping before transfer should be done with much care, using—

Water - - - - -	1 litre.
Carb. sod. crys. - -	30 grains,

which can replace any other alkaline solution.

On porous stone a portion of the water used for transfer is found during the operation to be absorbed by the underlying substratum. Aluminium not being porous, the water has to be driven off by the thick ink so that the latter may come into direct contact with the metal; here it is that alkaline water is of use. Ordinary water is antagonistic to thick substances, alkaline water is not so.

(To be continued.)

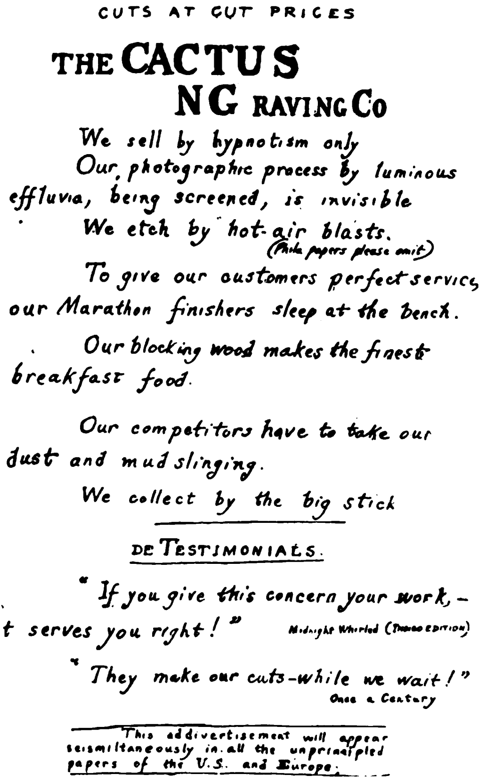
A Process Dinner in New York.

There are certain things which the American seems able to do better than his British cousin can, and surely one of these is the organising of a process engravers' dinner on short notice. When the editor of this journal called, quite casually, upon Messrs. Epstean & Walker of the Walker Engraving Co., they seized upon the opportunity for calling "the boys" to a banquet, and although less than a week was given for the arrangements, a score responded to the call and did full justice to the fare of the Hotel Brevoort. The menu and programme was a worthy work of humor, designed on slightly boisterous lines and running into four pages of two-colored fun. The names of those attending were as follows; the guests being marked with asterisks.

*Max Levy, *J. C. Oswald (*American Printer*), *Wiley Brown, *J. A. Tennant, *H. Snowden Ward; Anderson, Consolidated Eng. Co.; Browning, Galvanotype Eng. Co.; Bradley, Consolidated Eng. Co.; Cooper, Suffolk Eng. Co.; Colton, Amer. Bank Note Co.; Epstean, Walker Eng. Co.; Filmer, Royal Eng. Co.; Fleming, Amer. Bk. Note; Gerland, Central Bureau of Eng.; Harding, Harding Eng. Co.; Lenz, Farmer Zehr Co.; Lowes, Moss Eng. Co.; Morley, Electro-Light Eng. Co.; Patterson, F. A. Ringler & Co.; Reid, Consolidated Eng. Co.; Ringler, F. A. Ringler & Co.; Sherman, Suffolk Eng. Co.; Walker, Walker Eng. Co.; Wilson, Electro-Light Eng. Co.; Wilkinson, Zeese-Wilkinson Co.

After due refreshment, our editor was called upon, as the principal guest, to speak of process matters as they existed in Britain, and when he attempted to close, was plied with many questions showing the keen and lively interest with which the members follow the doings of the trade, even in far-away England.

Mr. Max Levy spoke well and excellently, praising the habit of frequent meetings as being more valuable to the trade than any price-maintaining union, and urging all to strive for some personal and characteristic style or field of work, which would raise each one above the level of harassing competition. He pointed out that in spite of many assurances by his agents and friends that the prices of Levy screens "must" be reduced, he had been able to keep them at one level; somewhat higher than the price at which they were first issued, and that the price was identically


CUTS AT CUT PRICES

THE CACTUS
NG RAVING Co

We sell by hypnotism only

Our photographic process by luminous effluvia, being screened, is invisible

We etch by hot-air blasts.
(Phila papers please omit)

To give our customers perfect service, our Marathon finishers sleep at the bench.

Our blocking wood makes the finest breakfast food.

Our competitors have to take our dust and mud slinging.

We collect by the big stick

DE TESTIMONIALS.

"If you give this concern your work, — it serves you right!" Midnight Whirled ([illegible] EDITION)

"They make our cuts — while we wait!"
Once a Century

This addivertisement will appear seismiltaneously in all the unprincipled papers of the U.S. and Europe.

the same in all parts of the world. Customers, and even friends, were too prone to tell a man that his prices were too high, and a cardinal principle for process men should be a determination to have reasonable and profitable prices, fixed by each man for himself and not settled by his customers or his competitors.

Mr. J. Clyde Oswald made a bright, humorous, encouraging, and typically after-dinner talk; and Mr. Wiley Brown said something about the difficulties and expense of manufacturing copper fit for engravers' use.

Mr. John A. Tennant (Tennant & Ward) spoke eloquently of the marvellous progress of the craft during the comparatively short period of its existence, of its triumphs over technical difficulties, its advance in artistic skill, its solution of many commercial difficulties, and finally of its enormous power in fostering (if not actually creating) important businesses. He instanced the motor-car industry as only one out of many that owed much success to the magnificent catalogue and advertising matter provided by the "process" trade.

Many members of the Association responded to the genial call of Mr. Wilson, from the chair, and their suggestive, useful speeches shall have comment later.

The Future of Photo-Lithography.

Those who watch the signs of the times can have little doubt that lithography, which has suffered enormously from the help given by half-tone to letterpress, is awakening very rapidly from its lethargy, and is bound to be either an extremely valuable ally or a most dangerous competitor of the process man of to-day. There is no fundamental reason why every lithographic firm should not have its own photo-mechanical department, or why the photo-part should not be done by the process man, just as he does it for the letterpress printer, but whereas letterpress photo-mechanical work was taken up by special firms, the litho development is being left entirely to the printers. It is worth thinking over very seriously.

The factors that promise immediate and great advances in lithography *versus* letterpress are the general adoption of metal-plate printing and the consequent use of rotary presses.

There may be personal reasons—secret process-mongering and craft jealousy—why lithography has not made more progress in recent years, but those who see the work of the craft schools must realise that these old difficulties are breaking down. Recently *The National Lithographer* reviewed the situation, and its remarks, though addressed to Americans, are not without their interest in the old country:—

"It is a thoroughly established fact that a science, trade, or calling cannot stand perfectly still, but must either advance or retreat, go up or go down—must either keep abreast the times with the march of progress or be relegated to the rear. In what position, then, will the lithographic art of the future find itself? Will it take its proper place at the head of the list of Graphic Arts, or will it drop back to the rear and practically become a lost art? The answer to these questions must be looked for among the lithographers themselves.

"Lithographers in general are not lacking in brains, but it is evident that at present they are not using them to the best advantage.

"How many lithographers of these days are animated by the desire to improve their art? How many are willing to spend their time and money to help to keep lithography at the front? That it can be improved there is not a shadow of doubt, and if the same amount of research, enthusiasm, and ingenuity were devoted to lithography as there is to process work at the present day, we would not be relegated to second place in the printing art.

"Let us hope that the day is not far distant when the employers will encourage their men to use their talents for the common good, and that the men, on their part, by technical education and private research, will use their best efforts to bring lithography to its proper place—the front.

"Individual ability will not have the desired effect, nor will the higher education and skilfulness of the few bring about the result sought, but the general high average of ability among all the workmen is rather what is wanted. The curse of lithography to-day is the 'secret process.' The fact that one man has a way of doing a certain thing better than it is ordinarily done, may temporarily bring that man a few dollars or a few cents more than if he did not have the knowledge, but at the same time the craft is drifting backward and being superseded by something else, which in the end will make the knowledge of this one man worthless even to him. What is wanted is general information, not individual information.

"On every side we see evidences of the catering to the public taste in art by demonstrations and examples of the three-color process, and there is no use in shutting our lithographic eyes to the fact that this class of work has come to stay, and that lithography will have to wake up if its laurels are not to be wrested from it. From a critical lithographer's point of view these reproductions are not by any means perfect, but that makes no difference to the proprietor of certain tobacco or soap, who only sees in this process a means of bringing before the public (90 per cent. of whom will consider it beautiful) a pictorial advertisement setting forth the merits of his wares.

"If the three-color process, still in its infancy, can achieve such results to-day, what chance will lithography have of competing with it ten years hence, when the process will have attained greater perfection?

"It is time for all lithographers to work together for the benefit of the craft. It will take the efforts of every man in the business to keep the art of lithography from drifting backward toward utter oblivion. It can be saved. It can be improved. It can be brought to and kept in the very front rank of the graphic arts, but it will take united effort to do it.

"Think this matter over and see if you do not want to exchange some of the lithographic information you have for some of that of your neighbor, in order that you both may be benefited."

We believe that lithography in Britain is in much too alert a condition to justify the gloomy view taken by our American contemporary, but there is ample room for improvement to result from the diffusion of knowledge and the exchange of information. The progress in the immediate future will doubtless come largely from the "process" side, so we offer our pages to anyone who has matter of interest to communicate.

Artificial Litho Stones.

The increased use of metal plates for lithography seems to have encouraged attempts to render lithographic stone less expensive, with the result that several methods for cementing small stones into large ones, and for making artificial litho stone, have been patented. Some of these have been described in recent issues of this magazine.

Another attempt, made by Julius Wezel of Leipzig, deals, not with the composition of the artificial litho stones, but with machinery for making them. Instead of grinding up actual litho stone or other material and compressing it into thick slabs, he produces metal plates faced with thin coatings of litho stone material. The advantage of this seems to be that what is the equivalent of a real litho stone can be made in absolutely any size, and that therefore it will be possible to produce surfaces having all the advantages of the stone itself, but without any limit of dimensions. In view of the fact that the larger-sized stones have been enormously expensive as compared with smaller ones of the same quality, this point is very important. In preparing his stones, Mr. Wezel uses a machine having a series of travelling bands, upon which the metal bases are laid. The band carries them slowly through a chamber in which they are heated from below, and are sprinkled by means of a series of atomisers with an exceedingly fine spray of lime solution from above. The heat causes the water of solution to be driven off and the lime substance to be deposited upon the plates in a perfectly even, dry hard layer. The thickness of this layer is regulated by the speed at which the bands travel through the chamber, and there is no necessity for the workmen to enter the lime-chamber, as the moving bands extend beyond it at both ends, so that the untreated metal plates can be fed at one end and taken off at the other. To save labor, allowing one man to both feed and take off, the bands can be so arranged that while one set of plates is proceeding through the machine in one direction, another is meeting it in the reverse way. Thus, at each end a workman feeds on to one band, and takes off from the other. As the heating of the plates is by steam, and as the steam cannot be allowed to reach their upper surfaces, it is necessary that steam-tight joints should be made between the plates and the walls of the heater, and the methods of doing this are amongst the subjects of the patent.

Killed by their own Debasement.—The "comic" color supplements, in yellow, green, blue and red, that have formed hideous and erronous features of certain American Sunday editions of the daily newspapers, are falling into disfavor. *The Boston Herald* was the first to throw them over publicly, and there is talk of New York papers following *en masse*. One of the newspapers that has not been bitten by the craze says:—"In all the amazing output from the printing presses of this broad land there is nothing quite so solemnly pathetic, idiotically stupid, or maddeningly inartistic as the pages of feeble, discolored, tawdry, vulgar, slap-dick drivel which, under the name of comic supplement, carries anguish and depression into the American household."

In the passing of the comic supplement certain engravers will suffer loss of work. They, fortunately, are not responsible for the degradation. Vulgarity, attained in the effort for popularity, killed the old-time stereoscope, and in many places has killed or is killing the kinetogram or moving - picture. Evidently, vulgarity is not profitable in the long run.

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Applications of Photography to Lithography.

By Guy Simmons.

(A lecture delivered at the Bolt Court School of Photo-Engraving.)

We shall divide our subject up into three sections:—

1. The bitumen grain process from continuous tone negatives.
2. The aluminium process from line negatives.
3. The half-tone and color process from continuous or screen negatives.

We will first deal with the bitumen process. The old bitumen process and the new differ in one or two respects. In the old process the operator did his best to get his sensitive film on the metal plate as "shiny," and even free as possible from grain of any kind. With the new process, the operator tries to get his sensitive film even but with a grain all over. This is the grain that is used for the printing, and is under the control of the operator. The bitumen divides up into two parts, one more sensitive than the other. The most sensitive forms the grain, the other part forms an even coating on the zinc. This latter grain must form as small hairs mixed up together, not as dry dust; the longer the grain can be made the better the gradation. If the grain dries as a powder, loss of gradation and difficulties in the after process will result. The grain must not separate and leave clean metal in between it, as, if it does, it will be very coarse and produce lack of detail.

The operator can, by altering the proportions of his chemicals, make the grain coarser or finer to the requirement of the subject he has in hand, or to the quality of the paper it is to be printed upon.

To proceed with the working details. Either metal plates or stone can be used for the process, but for ease of working, storing, and lifting about, the metal plates are the most convenient.

Dealing now with the two metal plates at disposal, we will take aluminium first and then zinc.

The aluminium plate is first cleaned with sulphuric acid as for ordinary work, taking great care to remove all the old work, washed thoroughly, and then put into the shuffling machine containing the marbles and pumice powder, and cleaned again by hand with a wood block covered with a thick piece of felt and pumice powder to reduce the coarse grain left by the machine. After this is finished, it is washed and dried as quickly as possible, and is then ready for use. The plates can be stored in this condition. The zinc plates should be of a good quality. We shall show later that the zinc plate has many advantages over the aluminium, also it is easier to clean, but one of its disadvantages is keeping it clean. A hard metal plate-polishing brush and some double washed emery are all that is needed to effect this. Brush in hand, shake a little emery on the plate, and scrub well to remove all the old work. If the plate is a new one, do the same to remove grease and tarnish marks. Continue until the plate looks clean all over, wash to remove all traces of emery with a sponge and a good flow of water, after which the plate is grained in a bath containing nitric acid and alum, about 2 per cent. Place the plate in this bath until it appears an even grain surface, and without a moment's delay wash thoroughly under the tap. Then replace the plate again in the graining bath and leave until the surface is even all over; wash again thoroughly and dry with a wash leather, finishing off with heat and a fan, so as to prevent tarnish marks. The plate is then ready for use, and must be coated straight away.

Coming now to stones, which should be of the hard blue variety. They are cleaned in the ordinary way, keeping the surface even and as flat as possible, as the negatives have to lie in contact with them. After cleaning with pumice stone and finishing with snake stone, they are washed thoroughly and dried, and are then ready for use.

The chemicals which are used in the preparation of the coating solution should be kept at an even temperature, in fact the same temperature as the room used for coating, *i.e.* about 65°.

The coating room should be as nearly air-tight as possible, as the least draught of wind will spoil the grain, and cause wave marks on the surface, which would ruin the plate. The room should be lit by yellow light and contain a gas burner. It should be as lofty as possible, to carry the fumes of ether and chloroform above the worker's head, as it is not advisable to open the door after you have commenced to coat.

THE COATING SOLUTION.

For this we require chloroform, ether, alcohol, yellow benzole and bitumen, all of which should be kept in the coating room. The bitumen should be a good clean sample, but not the pure washed sample, as one of a commoner kind is better.

A slightly different formula is used on zinc and stone.

We will first consider the coating for aluminium. For this we dissolve 7 gms. of bitumen in 100 c.c. of chloroform. Thoroughly dissolve this several hours before required, then add 9 c.c. of yellow benzole, adding this c.c. by c.c., and shaking all the time. Next add the 35 c.c. of absolute alcohol, adding only a few c.c. at a time, shaking well between each addition, and lastly adding 50 c.c. of ether, shaking the mixture well for several minutes, and filtering two or three times, through cotton-wool placed in the glass funnel, after which it is ready for use. This formula gives a medium grain with the room at 60° and the plate hand-warm. If the room is colder or the plate colder, a coarse grain will form; and again, if the room is very hot or the plate very hot, the grain will be too fine. This can be ascertained only by coating a small piece of aluminium to test the solution. On examining it, the grain can be altered to the requirements of the operator, for if the grain is too coarse, more benzole must be added. About 1 c.c. should be enough. This must be added very slowly, shaking all the time. If the grain is too fine, more alcohol must be added: about 2 to 3 c.c. should be sufficient. This, again, must be added slowly, well shaking between each addition.

The yellow benzole is obtained from the gas works. No other benzole will do. This can be readily obtained from Messrs. Fox & Co., chemists, Bethnal Green Road. The whole secret of the grain lies with this substance, and great care should be taken to obtain the correct article. The complete formula for aluminium is as follows:—

Asphalt - - -	7 gms.
Chloroform - -	100 c.cs.
Benzole - - -	9 ,,
Alcohol - - -	35 ,,
Ether - - -	50

For the zinc, the quantity of the benzole and alcohol are slightly different, *i.e.*:—

Asphalt	7 gms.
Benzole	8 c.cs.
Chloroform	100 ,,
Alcohol	36 ,,
Ether	50 ,,

The formula for stone is—

Asphalt	5·6 gms.
Benzole	5 c.cs.
Chloroform	100 ,,
Alcohol	28 ,,
Ether	50 ,,

It is not advisable to mix more solution than is required the same day, as the grain alters when allowed to stand.

To Coat the Aluminium Plate.

Take the plate and warm it over the gas burner, making it hotter at the bottom than at the top, for as the solution runs down it gets coarser, and by having the plate hotter at the bottom this is prevented. Having ascertained that the solution gives the right grain, by coating a small plate and examining it, if not correct, add more benzole or alcohol. After this is done, take your larger plate, and having warmed it, fix it on to a large flat board to keep it even, and proceed to coat, your assistant handing you the bottle containing a funnel filled with the solution. Take the funnel and pass the lip along the top of the plate from one corner to the other. Returning again some few inches lower, the solution will then start to run down the plate. Keep the plate rocking in an up-and-down motion all the time, passing the funnel backwards and forwards until the bottom of the plate is reached. When the ether, etc., begin to dry at the top of the plate, the assistant fans with a cardboard fan to help dry the bottom of the plate, as the film is inclined to get thicker at the bottom. Do not attempt to catch any excess which leaves the plate, as it will be too thick for further use. Mouth and nose covers can be bought to prevent the breathing of the fumes which get very strong, and I should advise the use of them, as it is not advisable to open the door and let cold or fresh air into the room when coating.

After coating, the plates can be put aside and will keep for months, or can be used straight away. If the grain is correct, proceed to coat the remaining plates, but if not correct, they can be cleaned with benzole or benzine, and recoated without cleaning with pumice, etc. Coated plates will keep for months put away in cotton.

The zinc plate is coated in the same way, but the plate must not be made so hot as the aluminium, as it retains the heat much longer: also the grain has a tendency to get gelatinous and leave the clear zinc between the grains. This can be avoided by using the plate cold, or adding more alcohol to the solution. Stones should be made warm with a blow-lamp, rubbed with a piece of clean cloth, put upon the coating block and coated the same way, keeping the stone in motion all the time, after which it is ready for use.

(*To be continued.*)

Warning.—We feel that a note of warning is required for any experimenters with the process described above. With a formula containing such an inflammable compound, the use of an unprotected gas stove and ether (the vapour of which descends) in the same room appears to us most dangerous.—Editor, *P.E.M.*

("The Process Photogram.") March 1909

Notes on Etching Silver for Decorative Purposes.

By H. van Beek.

It is perhaps about twelve years ago that the writer in several articles drew attention to the usefulness of process methods in the minor arts and crafts. It must be admitted at once that the art-worker does not take at all kindly to such photo-mechanical help. He has no objection to using it so long as no trace of its employment is discernible in the finished article, but will not tolerate any such thing as a half-tone screen effect in an art product, and even when an irregular grain can be produced it is a hard trouble to get any favor for such methods in the metal or bronze crafts. The practical employment, therefore, of photo-mechanical work in the making of art-metal objects is very limited; in fact, it is confined to work where the result will give no evidence of the method. Since the silver etcher can make use of a photo-mechanical process it may be of service to the process worker if some hints on silver etching be given, a task which is rendered necessary by the extreme paucity of information on this subject in the text-books, even of the metal workers.

Two distinct methods are used for producing a clean and sharp etch on silver. In the first a strong acid (nitric acid) is used, whilst the second is an electrolytic method in which no acid is used. The result is very different in the two cases. Both give a clean sharp etch, but the acid never gives quite the same cleanness of cut which is obtained by the electrolytic process.

Ordinary silver, as used for metal work, contains about one-tenth of its weight in copper. The copper, during the smelting process, concentrates at one end of the bar and is distributed when the plates are rolled. Copper and silver being dissolved by nitric acid at quite different rates, it results that, on etching the alloy containing the two metals, a pattern frequently showing a very beautiful effect resembling the grain of wood is produced. This pattern in no way detracts from the lines of the design, and may frequently be usefully applied in the decoration of silver articles. In the case, however, of the electrolytic method no pattern is produced, and so long as the article is frequently turned in the bath uneven action upon the plate is avoided.

Since every etching method depends upon the application to the plate of a suitable resist it is necessary to point out that in the case of silver etching a very strong resist must be employed, whichever be the method of etching. It must not be forgotten that the nitric acid is best used of a strength of 66 per cent., a concentration in which an enamel resist would be readily attacked. The electrolytic method, on the other hand, tends to render the resist brittle.

The best resist for the purpose is formed by a strong bitumen varnish, the formation of which upon the metal plate is a subject which must be separately considered. Sufficient to state here that a 35 to 40 per cent. varnish is used, constituting actually a sharp cut bitumen relief. The printing process is an indirect one: that is, by transfer. On this I hope to contribute a subsequent note.

In making use of nitric acid for etching silver a first precaution is as to the temperature of the bath. It should be 60° F. Two baths should first be made, one of 18° Beaumé and the other 24° Beaumé. The following proportions of acid and water will give baths of these strengths:—

Water.	Acid.	Deg. B.
150	100	18
150	175	22
100	100	24

The nitric acid should be perfectly free from hydrochloric acid, since the latter would form a deposit of chloride of silver and effectually protect the metal against the further attack of the acid bath. This is a frequent cause of difficulty among those unaccustomed to silver etching. The simplest method of getting rid of any hydrochloric acid is to add a few grains of any silver salt, such as silver nitrate. The acid may then be passed through a filter and the etching commenced. It is a good plan to commence the etching with a strongish bath, say 24° Beaumé, which is used until the surface is evenly attacked and has a matt appearance. The etch is then continued with acid 18° Beaumé, during which the surface should become covered with very small bubbles of gas. Any brushing of the surface should be avoided: the bitumen becomes very brittle in strong acid, and the result would be to break it away where two lines join. Without any brushing action the wood pattern of the alloy develops perfectly.

ELECTROLYTIC ETCHING.

For this process an ordinary copper-zinc battery, such as that of Daniell, answers very well. The current is very constant and the voltage sufficient for dissolving the metal, being a 9-volt and giving quite a closed circuit at ·65 ampères, the latter depending upon the active surface of the plates. In place of an acid the agent employed in electrolytic etching is a salt of the metal which is being etched, in the case of silver 2 per cent. solution of silver nitrate. With this the action is very even. If the very finest work is not required the silver salt can be replaced by 2 per cent. solution of nitric acid. The plate bearing the bitumen print is attached to the copper electrode and a half-inch platinum wire to the zinc electrode, the distance between the two being about six inches. If the plate be turned from time to time the etch is remarkably flat, and two hours' action gives about the same result as the first etch of 150-line half-tone on copper. The first etch having been done, the latter part of the process is carried out only to secure more depth. All depends on the purpose for which the plate is intended.

The cathode being of comparatively small area in regard to the surface which is being etched, the metal from the silver plate deposited on it forms a very useful test as to how the process is working. The cathode will be black from deposited powder when the current passes, but will be instantly cleared when the current ceases to pass. When the bath after a good deal of use has accumulated too much metal, the current then passes too readily, and it is well to make up another bath, the silver in that which is discarded being readily recovered by well known methods such as the use of zinc shavings or potassium sulphide.

A Good Example.

The following letters, from *The Bulletin* of the I.A.P.E., speak for themselves, and illustrate an important point. Why should ten engravers submit sketches, valued at (say) even half a guinea each, in order that one of them may secure a job valued at (say) three to five guineas?

Globe Engraving and Electrotype Co., Chicago.

Gentlemen,—We have your letter of the 30th, enclosing bill for $5 for sketch for our spring 1909 catalogue.

We notice that you state you do not make the sketches unless the engraving is ordered from you. As we wrote you, we got a drawing that suited our purpose much better, as yours was too much like the one we had last year, and we are sorry indeed to learn that you are unwilling to put out sketches under competition with other firms. We received drawings from ten different engraving companies.

We return your drawing, also your bill, as we will not stand for a charge of this kind.—Yours truly, Robinson Seed and Plant Co.

October 5, 1908.

Robinson Seed and Plant Co., Dallas, Texas.

Gentlemen,—We are in receipt of your favor of the 2nd, returning the invoice herewith for making a sketch for your catalogue cover.

In reply to your comments as to our being unwilling to put our sketches in competition with sketches submitted by other firms, this is not a new proposition with us, and we desire to show you the injustice of your attitude.

The plates we made for your 1908 cover were charged at $35. You say that you received drawings from ten different engraving companies. We presume that every one of the sketches cost as much as the one we made—a total of $50. Therefore, by your indefinite request to submit a sketch, you have put the ten engraving companies to a probable expense of $50, and one of the ten will get an order for plates that may be charged at $35.

How would you like it if some concern was to send for $5 worth of your goods and to nine other concerns in the same line; then notify you that of the ten shipments received one had been selected, and your goods were subject to your order?

If of the ten concerns that submitted sketches you do not hear from the other eight, it will be because there are eight fool engravers in the country.—Yours truly,

Globe Engraving and Electrotype Co.

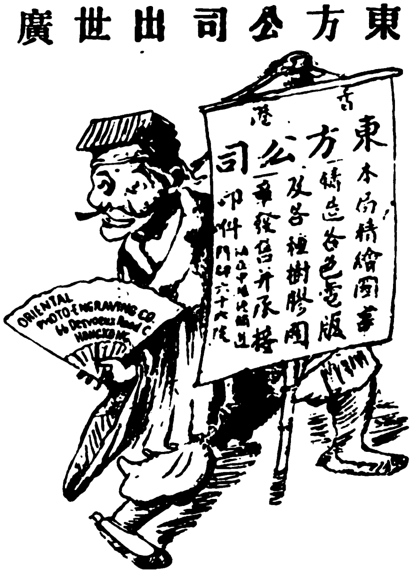
The point might be made even stronger, for while the goods of a seed merchant would be perfectly saleable if returned from approval, the sketches made by a designer for a customer's particular requirements are unlikely to be useful to other possible customers.

Brevities.

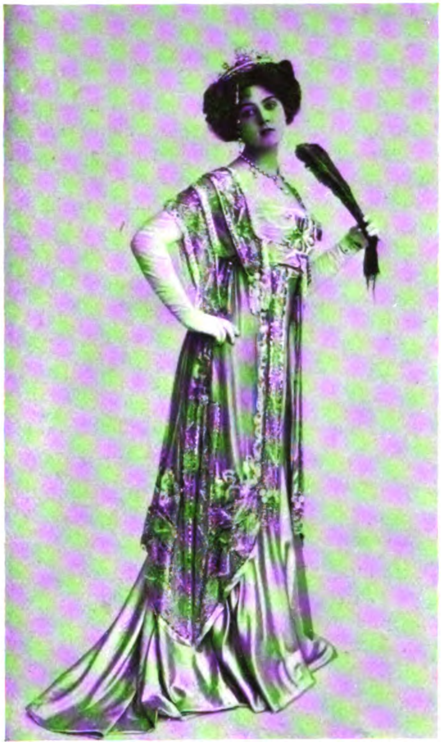
Erratum.—On page 218 of last year's volume the equation should read

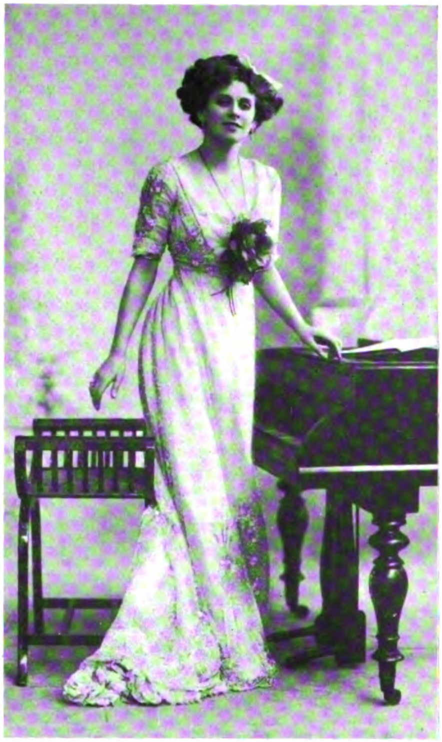
$$\frac{\text{distance between screen and plate}}{\text{diagonal of the space}} = \frac{\text{camera extension}}{\text{side of diaphragm}}.$$

Change of Address. — Messrs. Gee & Watson, Ltd., process engravers, have removed from St. Bride Street to 111 Shoe Lane, Fleet Street.


東方公司出世廣
香港
東方公司
本局精繪圖畫
精造各色電版
及各種樹膠圖
華發信并承接
印件
ORIENTAL PHOTO-ENGRAVING CO.
66 DESVOEUX Road C.
HONGKONG

A photo-engraver's advertisement from Hong-Kong (reproduced from a print in one of the newspapers) shows what different displays may be used in different parts of the world.





Fashion Plate Designs.—A new departure has been made in fashion plate work by the combined efforts of two firms, Messrs. Foulsham & Banfield, The Fashion Studio, Bond Street, who photographed the models, and Messrs. Carl Hentschel, Ltd., photo-engravers, who produced the blocks in *Beautiful Women in Beautiful Fashions*, which is the title of an illustrated sample book of fashions. The introduction states : "Paris leads the way and London has been slow to follow, but London has followed, and it is now generally conceded that the dress photographed on the real figure has an interest not possessed by even the best fashion drawing." We reproduce two reduced illustrations. The designing and publication of this booklet is another instance of the enterprise of Carl Hentschel, Ltd.

"**The Graphic Arts Year Book, 1909.**"—The third volume of this American Process Annual has reached us. Containing over 200 illustrations by many different processes, including a large number of three-color examples, it provides an excellent review of American illustration work: the large number of commercial catalogue plates exemplifies how our friends across the Atlantic avail themselves of the many reproduction processes for the furtherance of industrial concerns. The contributions to the text cover a varied field, including reviews of progress, photography in colors, photo-engraving and other processes, lettering and typography for printers, commercial illustrating, and other articles. We notice amongst the English contributors Wm. Gamble, H. O. Klein, Arthur Payne, A. J. Newton, A. J. Bull, Dr. Mees and Joseph Goodman. It is published by The Graphic Arts and Crafts, Hamilton, Ohio, U.S.A. Price $5.

The Bolt Court Lectures.—Mar. 4th, J. R. Riddell, "Three-color Printing"; Mar. 11th, J. Widdop (of Messrs. De la Rue & Co., Ltd.): "Some Experiences of Lithography and Photo - Lithography"; Mar. 18th, Arthur S. Newman (late of Messrs. Newman & Guardia, Ltd.): "The Design and Construction of Photographic Cameras"; Mar. 25th, A. Mackie: "Some Aspects of Technical Photography."

POOR JONES!

1. Jones gives personal instructions to Windjammer, engraving solicitor. "Going on vacation, you know, and must have cuts on time." 2. "Sorry, Smith, but can't go with you. Windjammer is late on my cuts, as usual. I'll have to stay home and hustle on that durned catalogue." 3. "Thunder and blazes! What do you call these things? Work bum, sizes wrong and 'way behind time, too. Every one's got to be made over. Windjammer, you're the limit! No more experimenting for me. Next time I'll go where I know I take no chances."

HAPPY SMITH and Poor Jones are two of the attractive creations of the ad-cartoonist of the Stafford Engraving Co.

"PLATOLOGY" is the title of a small periodical published by the Ormsbee Engraving Co., Syracuse, N.Y.

"ORMSBEE CUTS ARE PICA CUTS."—There is a special appeal to printers in this phrase. Is it not worth while for other engravers to copy Ormsbee in mounting all engravings on wood true to the next larger complete number of picas, in each direction?

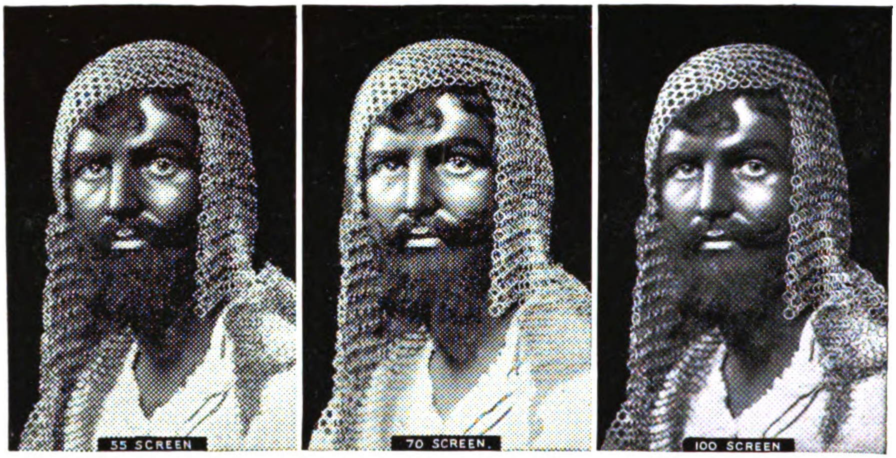
CONGRATULATIONS TO THE ANGLO-ENGRAVING Co., on securing the order for over 3000 blocks required in the Queen's Christmas book, on the excellent way in which it was executed, and on the capital advertisement and testimonial they have reaped.

"FROM FLOWERS POSED AND SUPPLIED by Jos. Fleischman" is the acknowledgment given by the Zeese-Wilkinson Co., of New York, beneath a very fine specimen of four-color engraving, direct from a group of chrysanthemums.

THE INCREASING USE OF TINTS is a very notable feature in the catalogues, booklets, railway "folders," etc., which are produced in America so much more lavishly, and, as a rule, so much more artistically than in Europe. The tint-using habit means extra grist to the process-engraver, and our readers should encourage it through their specimen-books and travellers.

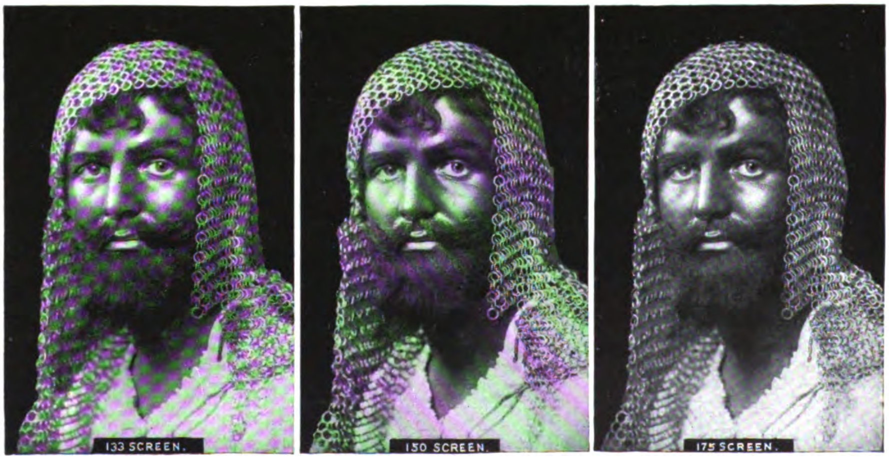
HAPPY SMITH!

1. Smith—"Stafford Engraving Company, Indianapolis. Gentlemen: We are sending you by express to-day copy for our new catalogue. These must be in good shape by—" 2. Smith—"Say, this is great! You don't have to worry when Stafford has your work. Too bad about Jones, poor devil!" 3. Smith—"Bully! Everything lovely. I knew they would be O.K. Stafford's the 'House' for me!"



W. & G. BAIRD, LTD., PHOTO-ENGRAVERS, ELECTROTYPERS, ROYAL AVENUE, BELFAST.

BAIRDS' TEST-BLOCK.—The illustrations on this page show an enterprising line that is being pushed amongst printers by the process firm of W. & G. Baird, Ltd., of Belfast, Glasgow and London. If every printer possessed one of these test-blocks we should see fewer specimens of poor half-tone printing, such as results from using paper that is unsuitable for the block. We are well aware that the majority of printers know what screen will be suitable for certain papers, but the trouble arises with their customers, many of whom think that if they have a block that has printed well on a certain job, that it is equally suitable for any other class of work. By the aid of such a test-block a printer will be able to demonstrate to his customer the necessity of having a block made to suit the paper that is specified for the work in hand. The block shows seven variations of screen from 55 to 175. Space does not permit us to use the full block, so we have had to omit the example of the 125 screen. Nickel-faced electros of this test-block are supplied to printers at 12s. 6d.


133 SCREEN.
150 SCREEN.
175 SCREEN.

DALZIEL AND THE DALSPRITES.—Our congratulations to the Dalziel Foundry, Limited, on their enterprise in the method that they have adopted for advertising the fact that they have now taken extra premises at Earl Street, Finsbury, and so have now two London foundries. Stereos by themselves do not offer much material to write up in the form of an advertisement, but under the title of "Dalziel and the Dalsprites" a most humorous publication has been issued with designs by Dudley Ward and letterpress by Frank Colebrook. Americans often adopt humorous methods for their advertising, but it is rarely that anything in this direction is resorted to by the staid folk of the old country. The writings, sketches, and color reproductions are so good that the *jeu d'esprit* will be perused with an interest unusual for anything of an advertising nature.

HUNTERS, LIMITED, Poppin's Court, send us a list of their screen bargains that they are offering to process workers for the purpose of clearing before their annual March stock-taking. A copy of this list can be had on application.

"STRENUOUS" ROOSVELTEENO AT THE METAL PLANER.
From *Dalziel and the Dalsprites.*

THE IVES COLORIMETER, a new apparatus for measuring color, has been adopted by the Bureau of Standards, Washington, D.C.

A BOOK ON VARNISH MAKING.—The well-known publishers of technical books, Messrs. Knapp of Halle, have just issued a work by Professor Max Bottler under the title *Die Lack- und Firnisfabrikation*, which deals with the raw materials for, and the methods of preparation of, spirituous, oil and other kinds of varnishes. Particularly from its description of the properties of the various gum resins, asphalt, caoutchouc, celluloid, as well as those of their solvents, the volume forms a useful work of reference for those engaged in photo-engraving and process experimental work. This portion of the book occupies nearly half of the text, the remainder consisting of a description of the plant employed in making varnishes. The concluding portion contains formulæ and methods of preparation of lithographic and typographic inks. The price of the book is 4 M. 50.

GOOD MEN SEEK A GOOD "SHOP."—Stephen H. Horgan, writing in *The Inland Printer* of the establishing of the Farmer-Zehr Engraving Co., in New York, says:—"It is the first indication that process work is moving out of the stagnation which followed the recent panic. Then the members of the firm, being perfectly practical men, fitted up their establishment with the newest and most improved cameras, lenses, screens and machinery. Further, they selected a building with plenty of light and air and made the sanitary arrangements as perfect as possible, so that they and their employees would not suffer in health. The result was that the best workmen in all branches of the trade applied for positions with them, showing that the skilled process workers of the day are not only looking out that the shops they work in are healthful places, but they also take pride in the tools placed in their hands. They prefer employment where they can turn out work that is creditable to not only the firm but themselves."

APATHY OF PROCESS WORKERS.—It is much to be regretted the poor support given by process workers to the excellent technical lectures that have been provided by the Bolt Court School. In his report to the advisory sub-committee the Principal says:—"Although we provide a course of lectures on elementary chemistry and physics in relation to photo-engraving, we have had only a maximum attendance of eight, with an average of under five. When I advertised one special lecture, I secured an audience of thirty, but though impressing the fact that these lectures were continued, I only secured one additional student. I cannot blame the lecturer or his subject-matter; it seems that the trade has not the *personnel* at present that wish to understand the fundamental principles that underlie the work. If so, this simply means that most future improvements have to come from outsiders and not, as they should, from those engaged in the industry."

COMMERCIALISM AT BOLT COURT SCHOOL.

The Editor, "The Process Engraver's Monthly."

SIR,—Mr. Cox has come down from Birmingham to give us a few wrinkles on the way to conduct a photo-engraving business. The burden of his song appears to be—if you are making a profit on your yearly business, find out in which particular department the profit is being made. If a loss—spot that also. Very good! but what business of any importance is being conducted on any other lines? How does it solve the difficulty of knowing what to charge our customers for blocks in which the work is of a varying character? Every engraver we meet deplores the square-inch system, which permits a customer to obtain a block full of difficulty and detail at the same rate as one which is easy and straightforward. How does Mr. Cox help us to surmount this inequitable system, which was good enough when rates were high, but which, now that rates are so "cut," inflicts a good deal of hardship and loss on the engraver? Mr. Cox has no real guidance for us on this essential point. He does, however, tell us to keep records, to compile statistics, to increase our clerical labours, to keep account of every plate, chemical, piece of metal, mounting wood, proving ink, etc., wasted, and above all—to think. Brains are evidently only produced in Birmingham.

Having gone to infinite pains to ascertain every fraction of profit and loss, gain and waste, he admits that he cannot ascertain the cost of any individual job. He does not even wish to do so. He is content with the square-inch system. He tells us it is of no use making on the roundabouts if we lose on the swings, yet he is satisfied if he knows his cost per square inch. We are all to work out our costs "per square inch," and then—well, we will know where we are. I must confess the argument scarcely appears convincing.

He says, take the work as it comes, large with small, difficult with easy, and put it all into the common stock pots of profit and loss. If a lot of small subjects come in make up big "flats" and make the best of them. If large subjects preponderate, do them and long for more. They are all in the day's work. If by chance you find that any particular kind of work is unremunerative, decline it, or find a more economical method of production. This, then, is the great scheme which is going to start the photo-engravers on the road to better conditions. Truly there must be a lot of "numskulls" among we poor engravers down south.

So imbued with the importance and merits of the square-inch system was the lecturer that he imparted to his audience with his knowingist look that he was contemplating a system of estimating for drawings at so much a square inch. What an innovation! A large firm I know of has been doing this for the last thirty years. For draughtsmen's work it answers very well, but if Mr. Cox intends that designs and real artists' work should be estimated on this basis, then all æsthetic instincts of my being rise in one vast earthquake of indignation and resentment. I think I shall voice the opinion of all artists if I say that such a method of valuing works of art would be intolerable.

I differ from Mr. Cox when he says that the process engraver is becoming more a mere reproducer. The most successful firm to-day is one where the technical and commercial sides are properly balanced by the artistic. If the engraver is not able to appreciate the art in his copies, and to interpret that art in its proper values; if, in other words, the customer is a better judge of art than the reproducer, then the latter is labouring under a great disadvantage—one which is unfortunately common to a large number of photo-engravers today.

If I were a user of blocks, I should hesitate to place my orders with a house where the artistic instinct did not prevail—certainly I should never ask it to produce a design, especially at so much a square inch.—Yours faithfully,

POLLY CHROME.

Estab. Jan. 1894.
"The Process
Photogram"

THE PROCESS
ENGRAVER'S
MONTHLY
THE PROCESS PHOTOGRAM
ESTABLISHED JAN 1894.

Vol. XVI. No. 184.
APRIL 1909.

Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly*.

Applications of Photography to Lithography.

By Guy Simmons.

(A lecture delivered at the Bolt Court School of Photo-Engraving.)

(Continued from page 64.)

The negative should be made on good plate-glass about ¼-inch thick, so that it can be laid on to the stone, and as most of the subjects are color, collodion emulsion offers many advantages. The color negatives are taken in the ordinary way through their respective color filters, but the shadows must be kept absolutely free from fog, since this will lengthen the exposure out of all proportion. The negative should be rather strong in the high-lights, as the printing is best done in direct sunlight or in front of some very powerful arc-lamps. The printing frame for plates is best cast in aluminium 43 x 33 (the front of thick plate-glass), which will stand any heat and weather, without, of course, altering in shape, a necessary point, since in bad weather these are left out to print during showers of rain, etc. The back of this frame is also aluminium ½-inch thick, and pressure is got by the collotype system of wedges and wood bearers, any necessary pressure being thus obtained. The cleaned negative is placed in the frame, the coated plate on top of it, and then the exposure takes about one hour in direct sunlight, or about 2½ hours in front of two Westminster enclosed arc-lamps.

The aluminium frames will stand all changes of temperature and dampness, and will not alter a bit. Sometimes a frame which has been printing in the open all day has had to be finished off in front of the lamps, and has become hotter than the hand could bear; if wood were used it would be all shapes in a very short time.

After exposure or printing, the plate can be put aside or developed straight away. To do this, take a large piece of cotton-wool and saturate it with developer made up as follows: Benzole 8 parts, french turpentine 50 parts, aniline oil 1 part. Rub the plate with this, beginning at the top and working to the bottom, going from the left side to the right. After squeezing the turpentine out of the wool on the top of the plate and letting it run down, when it reaches the bottom, the image appears very plainly. Put under the tap, using as much force as possible, removing all turps with the water. Wash thoroughly, and dry with a wash-leather. When dry, continue to re-develop by first coating with turpentine, then saturating a piece of cotton-wool with developer, and rubbing any part requiring lightening until in the highest lights the grain disappears entirely. Local development can be carried on in this way, but when there is drawing which is to be kept, it must be protected with a strong solution of gum on the parts that have to be kept and thoroughly dried. The developing can then be continued. If the plate is under-exposed the image will appear weak and develop nearly all away. If the plate is over-exposed the image will appear black and heavy, but most of this can be removed by continuing development. After the plate or stone is finished, the litho artist can continue the re-developing until he gets what he requires; the plate is then washed thoroughly, dried with a wash-leather, and cleaned with methylated spirit to remove all traces of grease left from the turpentine. The artist can then add work to the plate, and take parts entirely away as he judges best.

The aluminium plate is then put into a bath of very strong phosphoric acid. Leave in this bath for five minutes, wash well under the tap, then roll up with litho black ink; and if the plate rolls up dirty, etch until again the grain takes the ink and leaves the plate clean. If the plate will not roll up clean, re-develop with developer of benzole and turpentine, and etch again in the same etching solution; wash well and proceed *to roll* the plates again.

For etching zinc plates make up the following solution: Gum, 6 gallons; phosphoric acid, 15 ounces. For use take:—Saturated solution of gum, 20 ounces; concentrated phosphoric solution as above, 20 ounces.

Etch with this in the ordinary manner, and proceed to roll up the plate the same as aluminium. The zinc is easier to etch and easier to keep the grain open, but the greatest care must be exercised to keep oxidation away and the plate perfectly clean, as the slightest mark will roll up solid, and will give great trouble to get clean again. When it has been rolled up and considered correct, proofs in black can be pulled, and any additional work can be added, after which it is rolled up in its color and proved.

One of the greatest difficulties of this process is the transferring, and it is best, wherever possible, to work on the original plate, as in transferring, the very fine work has a tendency to go away and the close work in the shadows to close up and thicken. To avoid this the printer must take great care to keep his plate open and working clean, using the best of papers and inks.

We will next deal with the photo-litho process with line negatives on aluminium and zinc.

This is a very easy process, but extremely useful in every big litho printing house. A line job can be photographed, printed, rolled up and proved in thirty minutes with ease, and as many transfers taken from the aluminium or zinc as required, every one being exactly the same size. This process is worked in the same way as the albumen process on to zinc for line etching. The largest firm in Germany still uses this method for all their work, half-tone, three- and four-color, all of which is done on zinc. I called on this firm and asked to see the manager, who showed me into every department and explained everything I asked. He said he had absolutely no trouble whatever with zinc, and they had never used a piece of copper for their color work. One very interesting thing he showed me was a powerful air-pump, which he employed to dry the plate after rolling up and developing, that is, when the plate has deen developed. Instead of standing it in a rack to dry, he took this force of air and passed it over the plate, which dried it perfectly evenly, without a mark of any kind in about three seconds, after which the plate was dusted with a very fine asphalt and again the air blast played on it. A slight dusting with a dusting mop, and all was ready for glazing over the gas, and by the appearance the results are very difficult to tell from an enamel on copper.

We have rather left our subject, but return to the coating of aluminium or zinc. The plate is cleaned with pumice powder for aluminium and the zinc is grained in the graining bath, after which it is coated with a solution made up of—

Whites of 4 eggs.	
Ammonium bichromate	½ ounce
Fish-glue - -	1 ,,
Water - - -	30 ounces

Coat the plate with this, which is very thin, and warm over the gas, put into contact with the negative, and print, which takes about forty-five seconds. After printing, roll the plate with ink made up as follows:—

Stroeger's* transfer ink	1 part
Best litho black -	1 ,,

Mix well, and roll up the slab, using very little ink. Cover the plate entirely, keeping the coating thin and grey. After which, place the plate under the tap and remove the ink with a piece of cotton-wool, then dry by twirling the plate over the gas, but do not let it get hot, and it is ready for etching and rolling up. First, dust over with French chalk, etch in phosphoric acid, and gum. Roll up first in black ink and pull an impression, then in transfer ink.

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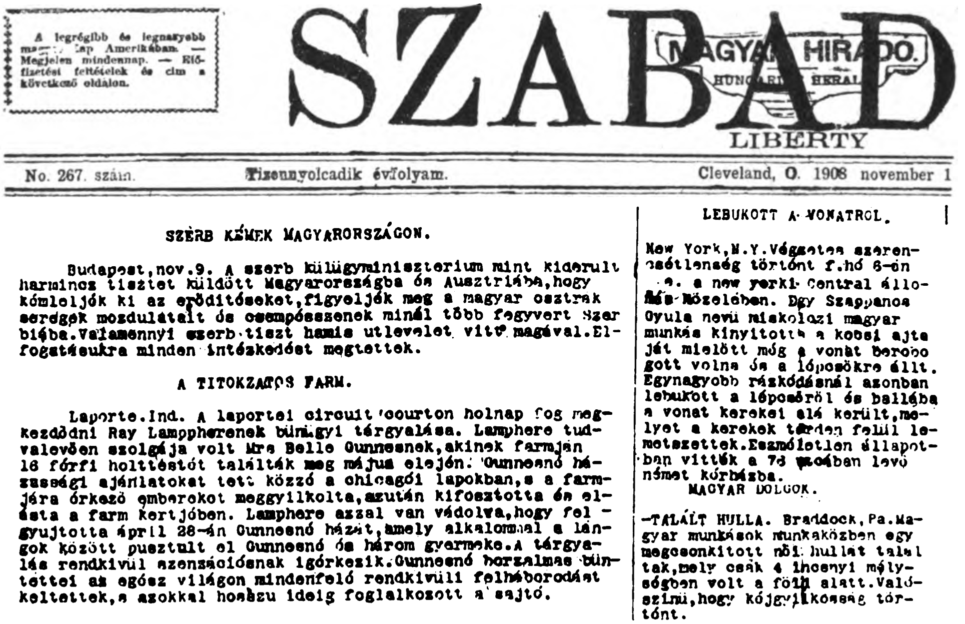
* Stroeger & Co., Barton Arcade, Manchester.

(*To be concluded.*)



A legrégibb és legnagyobb magyar lap Amerikában. — Megjelen mindennap. — Előfizetési feltételek és cím a következő oldalon.

SZABAD

MAGYAR HIRADÓ. HUNGARIAN HERALD

LIBERTY

No. 267. szám. Tizennyolcadik évfolyam. Cleveland, O. 1908 november 1

SZÈRB KÉMEK MAGYARORSZÁGON.

Budapest, nov. 9. A szerb külügyminisztérium mint kiderült harminc tisztet küldött Magyarországba és Ausztriába, hogy kómleljók ki az eröditóseket, figyeljók meg a magyar osztrák seregek mozdulatait és csempésszenek minél több fegyvert Szerbiába. Valamennyi szerb tiszt hamis utlevelet vitt magával. Elfogatásukra minden intézkedést megtettek.

A TITOKZATOS FARM.

Laporte. Ind. A laportei circuit courton holnap fog megkezdődni Ray Lamppherenek bünügyi tárgyalása. Lamphere tudvalevően szolgája volt Mrs Belle Gunnessnek, akinek farmján 16 férfi holttestét találták meg május elején. Gunnessné házassági ajánlatokat tett közzé a chicagói lapokban, s a farmjára érkező embereket meggyilkolta, azután kifosztotta és elásta a farm kertjében. Lamphere azzal van vádolva, hogy felgyujtotta április 28-án Gunnessné házát, amely alkalommal a lángok között pusztult el Gunnessné és három gyermeke. A tárgyalás rendkivül szenzációsnak igérkezik. Gunnessné borzalmas büntettei az egész világon mindenfelé rendkivüli felháborodást keltettek, s azokkal hosszu ideig foglalkozott a sajtó.

LEBUKOTT A VONATRÓL.

New York, N.Y. Végzetes szerencsétlenség történt f. hó 6-án ... a new yorki Central állomás közelében. Egy Szappanos Gyula nevü miskolczi magyar munkás kinyitotta a kocsi ajtaját mielőtt még a vonat berobogott volna és a lépcsőkre állt. Egy nagyobb rázkódásnál azonban lebukott a lépcsőről és ballába a vonat kerekei alá került, melyet a kerekek térden felül lemetszettek. Eszméletlen állapotban vitték a 7d utcában levő német kórházba.

MAGYAR DOLGOK.

—TALÁLT HULLA. Braddock, Pa. Magyar munkások munkaközben egy megcsonkitott női hullát találtak, mely csak 4 lábnyi mélységben volt a föld alatt. Valószinü, hogy gyilkosság történt.

In a recent issue we noted that a Hungarian newspaper, *Szabadag*, published in Cleveland, Ohio, had resorted to typewriting and zincography when its compositors went on strike. Above is a reduction of part of the first page of one of the copies prepared in this way.

A Gallery of Photo-Engraving.

By N. S. Amstutz.

By "gallery" I mean a room where specimens of an establishment's photo-engravings could be displayed. This would excite a competitive spirit among the operators, besides making a good advertisement for the house.

It should not be understood that a sample of each product should be exhibited, because this would be impracticable, but distinctive work of several classes should be placed for easy reference and study under natural order heads, as, for instance, 1, Line Work; 2, Half-tone Work; 3, Combined Half-tone and Line Work; all in *black-and-white*. Another group under monochrome (a single color in any pigment), again using the divisions of the first group. A third group under *tri-color* or *trichrome*, the equivalent of three-color, using a sub-classification, dividing the specimens into divisions relating to spring, summer, autumn and winter, with sub-groups of landscapes, seascapes, etc. Other arrangements will suggest themselves. A specific arrangement as to classification is not attempted. The value of a collection of representative specimens of the house, as well as of its competitors, is apparent. Such a gallery would in a short time pay for its installation and maintenance through greater efficiency attained by the workers. At present, with few exceptions, the compilations of specimens are an unused means of advancement.

To simplify matters, the work might be divided into black-and-white, three-color and four-color work, and representative specimens fastened to folding exhibit boards, placed in portfolios, or framed. Separate sheets should also be placed in large numbered envelopes and a card index of the contents made, so that individual sheets could be used in any department, when needed, for comparison and study.

In this connection, the desirability of having record sheets of a distinctive color is suggested, with spaces for the title of the subject and any special data in reference to it; the date when taken and by whom, the department, and when returned; such sheets being substituted in the large envelopes for the specimen when removed, so that each envelope would contain either a specimen or a record sheet.

Suppose an etcher has in hand an autumnal landscape, in color, for execution, and finds himself in a quandary as to the treatment certain portions of one color-plate or the other should receive. With immediate access to a number of specimens of autumn scenes he would be enabled to quickly decide what were best to do, without uncertainty, and it is no presumption to state that the quality of work and its expeditious execution would be materially advanced.

The artists should also find such a gallery of great help, because the treatments accorded different subjects would become a source of advantage in the laying out of any design, conventional or otherwise; likewise, the photographer and the finisher would be benefited by such an outfit.

In order that each department might secure the greatest advantage, it would be best to divide special sets of specimens to meet the special wants of each department, one group representative of the artist's phase of processing, another of the photographic, and a third of the etching, while a fourth one would serve the finishers. In this way all the employees would be in continuous touch with the best results produced. Even casual inspections of such results would become an unconscious incentive to an employee of even ordinary ambition to emulate the best rather than be satisfied with mediocre attainment.—*The Inland Printer.*

√

Inks for Half-Tone.

Abstract of a lecture at the Bolt Court School by Mr. C. I. Smythe, of Messrs. Mander Bros.

FROM the days of Caxton to comparatively recent years there existed no such person as a printing ink manufacturer. The printer ground his own ink, and, judging from the receipts which are to be found in cyclopedias and text-books, some of the ancient formulæ have come down from remote ages to the present day. From an American book in my possession, published in 1892, I have culled the following choice formula for the manufacture of printing ink, presumably black:—"Mix alcohol with tar, then fire the alcohol, and condense the vapors arising from the combustion of mixture; 10 gallons of the oil thus made is then mixed by boiling with one gallon of burnt corn meal or flour and about 10 ozs. of linseed oil in a drier." Such ludicrous formulæ are quite commonly found in text-books which profess to be comparatively up-to-date.

As a rule modern printing inks are composed principally of a suitable pigment coloring matter ground by means of powerful machinery into varnish made by the thickening of linseed oil by heat. The manufacture can only be undertaken successfully by those who are themselves pigment color makers or who have an exact chemical knowledge of the pigments which they grind into inks. A short review of the principal classes of pigments used in ink making may probably be of some interest, and I will therefore give a few instances.

Black, as a rule, is some form of carbon formed by collecting the smoke produced by the combustion (under limited access of air) of various gaseous, liquid, or solid bodies. A large proportion of the black used in most of the finest process inks is produced by the burning of the natural gas found in Pennsylvania in the United States of America, and lower grade blacks are produced from the combustion of mineral oil, the quality of the black being lower according to the thickness of the oil used, the commonest blacks being produced from solid or semi-solid bodies.

Chrome yellows are produced in general principle by the precipitation of a lead salt in solution, with a solution of bichromate of potash.

Blues, including bronze blue, by the precipitation of potassium ferrocyanide, commonly known as yellow prussiate of potash, with a salt of iron.

By admixture of these two colors various shades of green are obtained.

Ultramarine blue is used extensively in printing ink, though for the reason which will be mentioned later it is not suitable for the finest process work. The manufacture of this color is carried on to a large extent in Germany, and consists in roasting soda ash, sulphur, and various siliceous bodies in a furnace.

Vermilion consists of quicksilver in combination with sulphur, and is chemically known as sulphide of mercury.

Anilines and lakes, another class of pigments, thousands of tons of which are annually manufactured, is obtained from coal-tar dyes, and many of the so-called "lakes" are derived from this source. The general principle in the formation of these colors is to fix a solution of coal-tar dye on a suitable base or substratum by means of a mordant. Other colors are produced by the mutual reaction of two or more coal-tar products which are in themselves practically colorless.

COAL-TAR LAKES.

A good example is with two solutions made from two coal-tar products known as paranitraniline and beta naphthol, neither of which is soluble in water, but has to be dissolved by the addition of other chemicals. The paranitraniline being derived from aniline, the resulting color may be described as an aniline color, and it is somewhat extensively used for printing ink. Its characteristics, however, are totally different from those generally attributed to aniline colors, and as the word "aniline" is very often misapplied, and the nature of the product itself very little understood amongst printers, it may interest you to hear a few facts about it.

It is produced from coal tar, subjected to distillation. Amongst the lighter runnings are benzene and toluene, exceedingly similar in their physical properties, and from which commercial aniline is obtained by first treating with strong nitric acid, forming nitrobenzene, and then acting on this chemically to form aniline. The latter article is an oily liquid of no great depth of color; indeed, when pure it should be practically colorless. From this substance all the true aniline dyes are made by various chemical processes, but comparatively few of them are used in printing ink colors. Many of the latter, however, are made from products extracted from the higher runnings of the coal tar, such as naphthalene, xylene, and anthracene. From anthracene is made an article called anthraquinone, which in turn produces alizarine, a yellowish powder insoluble in water and generally sold in a paste. From this are produced the so-called madder lakes, which are perhaps the most permanent red pigments suitable for fine printing ink.

These coal-tar lakes are produced in hundreds of different shades, and are exceedingly important in the manufacture of high-class process inks. There is a general impression amongst the uninitiated that a coal-tar color (generally incorrectly called an aniline color) is very fugitive and unsatisfactory. This is very far from being the case, for while there are many coal-tar lakes of exceedingly fugitive character, there are others which are permanent, and the coal-tar manufacturer is constantly producing new products which are in every way fitted for the manufacture of lakes suitable for the printing ink maker.

The insoluble pigment has to be completely separated from the aqueous solution in which it is precipitated, by suitable mechanical means, into a description of which it is not necessary to enter. The aqueous portion generally contains soluble salts which must be completely removed from the pigment, and this has to be done by washing repeatedly with pure water. Some pigments take as much as 12,000 gallons of water for washing a batch of only three hundredweight of dry color. In the perfect washing of one's pigment colors from every trace of soluble saline matter lies one of the secrets of success in the manufacture of high-class process inks.

("The Process Photogram.") April 1909

THE MEDIUM OR VEHICLE.

The medium used in grinding inks generally consists of linseed oil (or varnish) thickened by prolonged application of heat, various degrees of viscosity being produced according to the time of heating. As a rule, pigment colors which are light in gravity require a thinner varnish than those of heavier gravity, and *vice versa.*

The manufacture and the selection of the varnishes, though comparatively simple in principle, is of the highest importance, and every manufacturer has his own special processes in blending and manipulation.

HALF-TONE INKS.

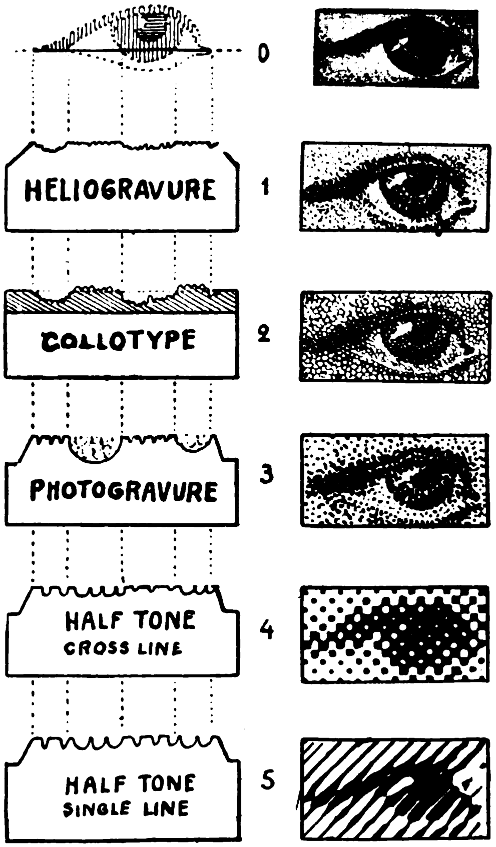
One of the first questions in the selection of ink for half-tone is, What is the character of the paper to be used, and at what rate are the impressions to be taken? Before the introduction of the half-tone process, both these questions were of much less importance, but in these days, when paper is coated with anything from starch to china-clay, and when machines are constructed capable of throwing off 2500 half-tone impressions per hour, the task of the ink maker becomes very difficult. Some printers expect an ink that will print equally well on a hard calendered paper as on one coated with a thick layer of sulphite of barium, which will print equally well on a slow and a quick running machine, which will dry equally well on all classes of papers, but which will never dry on a machine though left there for a fortnight. Added to this, they expect to be able to dig lumps out of the ink with a knife, and without levelling the surface of the ink in the tin or replacing the lid, to leave it on a shelf for a few weeks and find it again in as good condition as when first opened. These requirements have never yet been fulfilled, and are never likely to be.

It is, however, wonderful to what extent the up-to-date ink maker has succeeded in satisfying modern requirements.

(*To be continued.*)

Texture of ✓ *Reproduction Process.*

PROCESS TEXTURES are illustrated by F. Dogilbert in *Le Procédé*, by the sketches reproduced herewith. They represent diagrammatically, and with exaggeration, the technique of various methods, and the sections of the printing plates.



✓

Three-color Printing.

An abstract of a lecture at Bolt Court School by Mr. J. R. Riddell.

Criticism and difference of opinion are productive of much good, and I think you will have room for criticism, for I am quite aware that my methods and opinion are somewhat unorthodox. But please bear in mind that I believe in them. Experience has made me change my methods and opinion a few times already, and more than likely will do so again, but the condition that I made before coming here was that it would be a practical talk in everyday language. Any hints which I may throw out are not to be taken as trying to teach any one their business.

The photo-mechanical process has limitations, and the fact of trying to do the impossible with three-color is productive of much harm. The engraver who ought to know best is the worst offender.

Originals.

A great deal depends upon whether the original lends itself to reproduction by the three-color process or not. Some artists' works are better than others. Owing to the transparent nature of water-color paintings, ideal reproductions are usually obtained from them. In oil paintings there is often a difficulty in getting the correct tone, owing to the difficulties of the underlayers of colors not apparent to the eye, but which act upon the negative. It requires the fine-etcher's skill and artistic knowledge to overcome the defects, and even then it is not always successful. The ideal painting should contain clean coloring, good contrast, but not too bright, with as little decided grey tones as possible, painted upon a material suitable for the subject, and with every consideration for the means of reproduction. For instance, a head with delicate flesh tints painted on a rough canvas will show the canvas markings in the plates, which, when printing, will develop into dirty smears and "rotten" shadows.

Results of Bad Originals.

This is where about 50 per cent. of the success of the process lies. A very great deal can be said about this from the printer's standpoint, which is often uncomplimentary to the engraver, and perhaps also unfair. But engravers, like other human beings, are not perfect. They sometimes send the printer plates that are "unprintable," from which it has taken the prover all his time to get a decent proof under the best conditions, and from which the printer is expected to run off a few thousands and keep up to the engraver's proof. The printer feels it unfair that he should be given a bad plate, for nine times out of ten he cannot locate the fault. He knows there is something wrong, and feels sure that he is not to blame for the poor results. If he is printing from electrotypes, the poor electrotyper suffers. The engraver has an anxious time, and there are many circumstances over which he has no control, but he ought to endeavor to place his work on such a basis that the printer will not get an unprintable plate and bring the process into discredit.

Register.

Printers are often blamed for irregularity of color throughout a job, when the supply of ink is not at fault. The plate may be so fine in register (or barely register) that the slightest variation in the laying on of the sheets will cause this variation of color-tone. A failure to register the sheet by the width of a dot will change the color results. (This is the result of the ruled screen.) See that the trimming of your plates when in register is exact. It is astonishing how the public get their eye on this. I have myself seen a plate condemned where the trimming was fairly well done, but perhaps showing a little irregularity here and there. The fault in a print $\frac{1}{16}$th of an inch out of register would often never be noticed by the same critics. I do not go so far as the traveller who said that it was because of the "soft" edges that all work was criticised, and that unless the edges were all trimmed exact the customer would not accept the job. But it is the attention to details such as these that shows the master of his craft.

Standardisation of Tone.

Is it not possible to standardise the tone of color plates so that they will all carry the same amount of ink? This would enable the printer when working different plates on a large sheet to get the proper color value and tones out of each subject. Under present conditions, in working to the color sheets sent out by the engraver with his plates it is impossible to get many of the plates when printed equal to the engraver's proofs. This is a great annoyance, and the difficulties of the printer are not often appreciated. If a reprint is required, and the subject is printed under different circumstances, it is next to impossible to get the result the same as the first printing. This, again, often causes trouble, and what I suggest is surely not an impossible proposition for the engraver to work out.

British versus American.

I thoroughly believe that the English engraver leads in producing a plate with all the fine detail in relation to tone and color. But while he has been putting all his thoughts and energies into producing a facsimile reproduction, he sometimes loses sight of the fact that the printer must have a printable plate if he is to produce a clean and pleasing print full of color.

In all seriousness I believe that we are behind our American cousins in this respect. Those of us who come into touch with American work know that it has not the fine technical details of the English work, but it has strength, tone, and clearness, and is effective. Is it not possible for the engraver, whilst producing a satisfactory reproduction of his original, to also give due attention to obtaining a good printable plate, and which will duplicate well by electrotyping?

Avoid "Toned" Colors.

Allow me to condemn with all my power the practice of proving three-color plates in toned colors. If the subject is beyond the possibilities of the three-color process use the four-color process, but do not attempt to do the impossible. The printer prints many subjects on a sheet, and cannot print different tones of color at the same time.

Perhaps the engraver will say the artist's demands are so exacting, and that this is one of the ways out of a difficulty. The engraver is sometimes "between the devil and the deep sea," but is it fair to the printer who may have given a price for printing the work, a number of subjects, on one sheet to find that he cannot do it at the estimate price, due to the engraver shuffling out of a difficulty in this unscientific manner, when the four-color process would more than likely do all that is required, and be cheaper to work in the end?

ORIGINALS VERSUS ELECTROTYPES.

Do we get as good results from electros as we get from originals? is a frequent query. "We do not!" We get good results by the most up-to-date means of duplicating, but I have not seen the electro yet which is equal to the original in tone, color, depth, and printing surface. You can show me sheets with originals and electros printed side by side that require an expert to tell which is which, but an expert *can* tell, and there is a decided difference when printing,

Electrotypes are very necessary when commercial work has to be printed in large quantities. If there are twenty on a sheet, twenty electros should be the same in color and tone, but twenty original plate duplicates would give twenty different results no matter how much attention they received.

PAPER.

A very large percentage of the success of process color printing is due to the paper.

All half-tone printing paper must have a regular, smooth surface. The ordinary mill-finished paper did not satisfy the needs, so paper-makers give that abomination called "Art." But there is still hope, for now the papermaker is getting out a dull finish paper which he says will give all the results obtained from a highly finished art or chromo. Will the public like the dull paper? I am afraid they will still ask for that paper with the "fine glossy surface." For success it is necessary that the paper should be fine in fibre and regularly coated. The coating must also be "fast," so that "pulling" will not take place, and must be evenly finished, with no variation in surface all through the stock. It should also be white, and not tinted one way or the other. It is seldom that paper will reach the printer in a condition for close register work, and it is necessary for him to give a good deal of attention to this.

"CONDITIONING."

If the printer is fortunate enough to be able to stock his paper for some weeks before printing, let him at least see that the stock-room is the same temperature as the press-room. Even this is not enough to ensure absolute register. The most successful producers of color-work have the paper laid out in small quantities in racks, and placed in a room of a high temperature to dry out all moisture. All paper for close register work must be well seasoned.

All paper should lie perfectly flat on the feed board, as it is impossible to get good register with a wavy paper; and to preserve the paper in the same condition as when the first printing went on, the printer should cover the pile with wrappers, taking care that the sides are protected, for if the edges absorb moisture, the result will be wavy sheets, one of the most annoying difficulties of the process printer.

Six weeks after the making of the paper is about the time the printer should think of printing, but how many of us can do that?

PAPER FAULTS.

The printer should, if possible, get the paper supplied so that the gripper will take the sheets the opposite way to which the paper was made on the machine. This will assist in preventing stretching.

Few, if any, stocks of paper run all through without any variation in the coating and finish. This irregularity prevents smooth regular printing, with the result that the printing appears "rotten," broken up, dull, and with a loss of definition. The paper will not receive the ink properly, nor give the same effect; then the process printer is condemned for irregular results in color, finish and tone. Another difficulty which the printer has to contend with is the "coating pulling off." This is not always the fault of a "tacky ink," but often due to the paper. There is nothing more troublesome for printers to try and overcome than this, for there is every chance in doing so that he will lose the strength and color value in the final production.

Some papers possess a chemical affinity for ink that is absent in others; to find this out is a matter of experiment, and even then it is difficult to get a remake exactly the same.

Do not let the papermaker think that he can rest. Oh no! He must come into line and help to perfect this delicate process.

(*To be continued.*)

The Process Man; and "His Little Ways."

Disconnected Extracts from a lecture at the Bolt Court School by Mr. Robert Vincent.

1. OBEDIENCE: A FUNNY STORY.

THE man of ideas will always be keenly sought for and paid for by the process master. There is no one keener in the uptake of new things than he, but it is the essence of our business that a clockwork regularity of method be observed throughout a workshop, from original entered on the books to plate packed for delivery, if a profitable balance sheet is to be drawn up at the end of the year; and though some men wilfully shut their eyes to this, it is as much their business as it is their employer's. I do not wish to infer the necessity of inculcating such a splendid obedience to rule and method as was shown by one of my gentlemen the other day, when I dropped my pince-nez chain into the perchloride rocking-bath to clean it, with the remark, "Leave it there; I will take it out in a minute." Business intervened, and three-quarters of an hour afterwards he brought me the vestiges of the clips from each end of the chain and a few grains of the links, with "Here's your chain, sir. I am sorry, but I *had* to take it out."

2. APPRENTICES; AND PRAISE.

A word of praise is due from the workers of those days to the two or three firms of that time, who are now also thriving, in that they loyally laid the foundations of their employers' prosperity as craftsmen, by taking on apprentices and binding themselves to teach the business as it grew about them; these apprentices receiving the full benefit of each new operation as it came into vogue. I am afraid many of them failed to understand what a tremendous strain it was on their managers and chiefs having to teach new processes at the same time as they were trying to make a decent turnover of work and profit for their outlay.

3. ADVANTAGES OF ENAMELINE.

I well remember the vain fears and flutterings among the zinc fine-etchers when they first saw "Enameline" plates, as they were then called. Their business was gone, they thought, almost as soon as it had come into being. I am of opinion that it was their hard labor only that was gone, and that fish glue introduced to them the halcyon days of "little drops of iron etching on their own," while they discussed the demerits of the negative and wondered afterwards where the markings came from. "Must be in the neg."

4. AN OLD-TIME METHOD.

One or two of the first firms to use copper in this country, among whom I was, had a way of securing the print, prior to fish glue, that may be of passing interest. Direct screen dry plates were taken and printed on carbon tissue that had been sensitised in a 10 per cent. warm solution of bichromate of potash, the time being judged with the actinometer. This print was squeegeed on to the copper and developed with boiling water, the result being hardened in a formalin bath. The etching was done in the photogravure way, in the perchloride baths, the acid soaking gradually through the print. The plate was then rolled up, deepened, and fine-etched with an ink resist, in the same way as the zinc half-tone used to be done. The results of this process, to my thinking, have never been beaten, though the commercially successful fish glue quickly ousted this beautiful but difficult and slow process.

5. THREE-COLOR, "SWELLED HEAD," AND CHOICE OF PROCESSES.

I have already touched on the danger of swelled head to the operator that the introduction of three-color work brought about, but the danger was to a great extent nullified by the ground work of the various processes having already become fixed on a scientific foundation; and the operator thus chiefly depended, not so much on his own experimenting, as on the practically applying of data given by known scientists to his particular process.

Thus the comparison of the different ways to produce the printing color negative, whether by indirect dry plate and positive and collodion plate, or by direct bathed panchromatic dry plate with screen, or by emulsion, is not as to which is best, but as to which is most convenient; and I take it that an operator in future will not be considered efficient unless he can adapt himself to all of these various ways.

For instance, it would be foolish for an operator who found himself in a city studio and a fog and smoke-laden atmosphere, to lay himself out to do his color work with emulsion, and be grumbled at for his streaky and carbon spot-laden negatives, when he can turn out color-perfect panchromatic dry plate screen negatives with automatically equal results and perfect sweetness. On the other hand, though the dry plates would be the cheapest because of their sureness in town, it does not necessarily follow that in a clean, country, daylight studio it would be advisable to stick to the dry plate, because most of the objections to emulsion are then absent, and it in turn becomes the cheapest. An employer has the right to command the way the work shall be proceeded with, and indeed must, so that the whole body shall work like one man, fitted together as a perfect machine working in harmony. It is not for the man to say, "What is it to the governor how it is done, so long as he gets it?" As a rule, the chief knows what he is about; and in the color negative, for instance, the chief knows the etcher whom he entrusts with the plate, even as he also knows the operator. This little fact is often lost sight of by the worker, and it is not letting you into a secret when I remind you that there is a trite saying that "The looker-on sees most of the game."

6. Newspaper Shops and the Trade. Also an Anecdote.

The advent of the newspaper process department has almost divided into two separate sections, both the operators and the etchers. To such an extent has this been done, though I think rather unnoticed, that from the workers' side there is a danger lest this causes for them a severance of connection, so that men employed in a general house will be unable to find employment in a newspaper process department, and *vice versa*. This, of course, works out rather hard on the man who takes up an honorable position as a very hard worker on a newspaper staff, because the demand is limited, and if he falls out he has less chance of re-engagement than a general hand, if the cult is encouraged that a newspaper man is not so good as a general shop man. This cult has started, not from the process master, who knows better, but from the process man himself, who perhaps little knows what a high quality etched block is needed to give even the poor results attained in print on the express-rate driven rotary machine used by the daily press of this country. I think I can best illustrate my meaning by this incident. In our firm's process department we have to cater for every class of work. Well, I had a new fine-etcher, and after he had etched some splendid fine-screen plates, he stumbled on to a batch of sixty-four and eighty-screen jobs, and the delicious mess and number of markings he got, to say nothing of leaving his dots in the bath, was awful. When I inquired into the cause of the disaster, he bridled up and said, "Oh! I am only used to good work." I believe it was he of whom the story goes that he had a plate to fine-etch and deepen that required very careful work, and when he had finished stopping out for deep-etching he put it in the bath for the last half hour of the day, with the idea of dropping the tint. When he left for the day he quite forgot his plate in the bath until home at tea, when, horrified at his oversight, he jumped on his cycle and rushed back to his firm, only to find the place locked up. What was he to do? He thought of the caretaker who held the keys, but on rushing round to him found him off for the evening. Back he trotted to the shop, and peering through the window saw the plate merrily etching away just out of reach. Visions of a lost situation roused his energetic mind, and he bethought himself of a providentially situated cracked window up the court, and carefully releasing the broken glass, undid the catch, burglariously invaded the premises, rescued his plate, got out the way he entered, and so saved the situation in more senses than one.

(*To be continued.*)

/ Aluminium in Metallography.*

(Continued from p. 57.)

UNDER these conditions thick ink has not during transfer to fight its enemy, ordinary water, to come into contact with the metal; alkaline water even facilitates the process by a saponisation, and plays between the aluminium and thick ink the part of a beneficent mediator.

It should not be forgotten that alkaline water should be used with much circumspection. Damp the plate lightly and regularly at the time of transfer, and use only good fine linen, not fluffy, and boiled four or five hours, changing the water if it becomes dirty, then dried and kept away from dust. This precaution is needed to remove from the linen the ingredients used in bleaching it.

At the time of transfer use six or eight sheets of flexible paper to press the transfer to the bottom of the grain, and run through fifteen to twenty times, to get a good impression, then use hot water for the final transferring.

The other operations ordinarily used with stone can be used also with aluminium. The transfer finished, the sizing is washed off; after which the plate is wiped with a fine linen cloth and dried quickly, then retouched if necessary. The plate is next dried, gummed, wiped, and dried.

INKING AND PREPARATION.

Nothing is more simple now than to proceed with the inking, properly called. Gumming and inking is done as if using stone, with a black in harmony with the work: a black generally covers well. A good transfer should present no difficulty in inking; if, however, that should occur, gum the plate again, and when dry place in a bitumen solution, consisting of—

Essence of rectified terebenthin - - - -	800 c.c.
Rectified benzine - -	200 c.c.
Bitumen of Judea (powdered)	100 grammes
Writing ink (copal) - -	½ stick.

This solution should only be made in a small quantity.

When the transfer is considered sufficiently inked, pass over it powdered resin and talc as with stone, and, the excess of powder wiped away, prepare in the ordinary way.

Do not forget that a transfer on aluminium burns easily; so we ought not to prepare it until it is ready for inking, well rosined and talced, and not allow the preparation to remain on aluminium so long as on stone, its action on this metal being immediate.

The prepared plate is washed with water, then gummed; the excess of gum is wiped off with a fine linen cloth, and the plate quickly dried. The gum dried, the plate is placed in turpentine or bitumen, as with stone, with this peculiarity, however, that water should not be put on the plate before the essential oil is entirely evaporated and the plate dry, as it would cause a veiling making necessary a slight re-preparation. There should never be a veiling in inking on aluminium if the precautions indicated here are observed (1). The rubbing is done with nigrivarine gum, and, if necessary, a little pumice powder. The rubbing is done, as on stone, with a goose-quill and a preparation to which is added some drops of pure phosphoric acid.

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* Translated from *Le Procédé*.

ORIGINALS ON ALUMINIUM.

Originals in pen or pencil are treated on aluminium as on stone, with, however, a few changes.

1st. It is not necessary to scrape. With the scraper the grain is spoiled; it is no longer able to retain the damping water, also after several printings the scratches take the ink. The grain, alone able to hold the damping water, having disappeared there is constant drying in that part, and the undamped metal takes the ink. If this happens to a plate intended to be used only as a matrix, the inconvenience is less important than if it is intended to be used directly on the machine—posters, for example. In case the use of a scraper should be indispensable, it ought to be handled very gently and injure the grain as little as possible. The thinness of the plates ($\frac{6}{10}$ths of a millimetre usually) does not permit such rough scraping as is usual on stone for certain lithographs.

2nd. The ink used for work on aluminium should be reasonably thick, to avoid too transparent a one, which covers badly.

3rd. When the pencil is used, it is equally necessary to cover well, for if the metal be simply touched by particles insufficiently adherent, these are detached at the time of preparation, and the finer parts seem burnt out.

4th. Brush-work should be done more lightly than the eye generally sees it on the plate; in fact the eye sees imperfectly, or does not see, a number of tiny points which blend into the grey color of the metal, but which are inked with the rest of the work.

Certain designers place by the side of their work a piece of white paper on which they make the same touches as on their plate. This witness allows the exact effect of the work to be judged.

PREPARATION OF ORIGINALS.

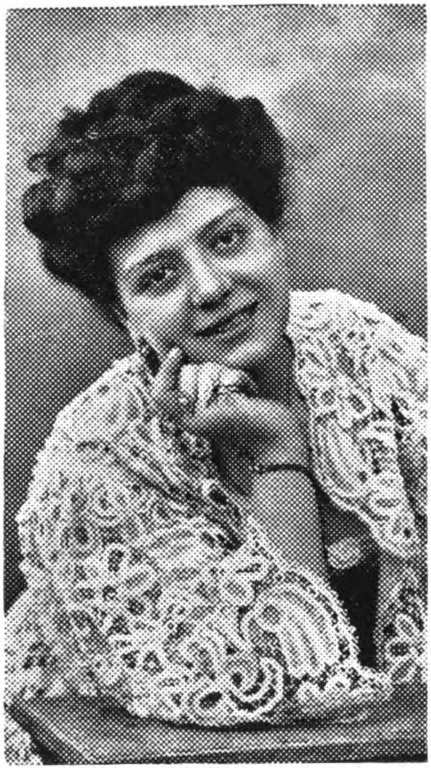
After having resined, then treated it with talc, the preparing solution previously indicated for this case is passed over it, and the amount of phosphoric acid is reduced by half, while the gum solution is kept rather thicker than when intended for transfers. The reason for this modification in the proportion of the constituents is provided by the advantage found in avoiding thus the possible dissolving of the ink and crayon used for making the composition. When the plate has been completely covered it is not necessary to wash the preparation in water, for that would wash away the ink and crayon which would not be dissolved by the preparation itself. It is required to wipe the preparation with a sponge dipped in gum solution; the ink and crayon are soluble in water but not in gum. The plate is then wiped with a fine linen cloth, then dried quickly; the gum once dried, the design is dipped in spirit, or bitumen, then inked as for transfers.

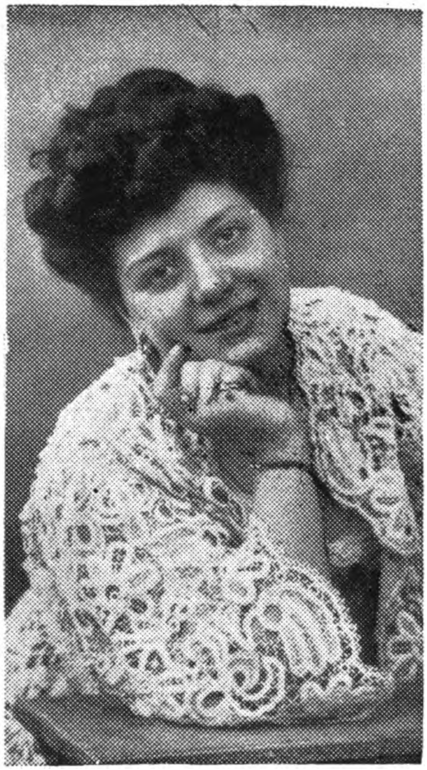
In the parts when for any working over it is needed to have the aluminium in a natural state, that is to say, ready to receive again contact with greasy ink, we should remove the insoluble salt which the preparation has caused on the surface. The formula for removal is as follows:—

Aqueous saturated solution oxalic acid	40 c.c.
Pure nitric acid - - - - -	40 c.c.
Distilled water to make - - -	1000 c.c.

Before using this it is necessary to ink the plate thoroughly, to resin and talc it. These precautions are necessary, as the strong acid baths will injure work insufficiently protected by inking.

(To be continued.)





THE JACOBI PATENT SCREEN, described in a recent issue and specially recommended for newspaper work, is illustrated (or its results are) by the accompanying blocks. The first is made with a Jacobi screen of twenty lines to the centimetre, and the second with an ordinary cross-line screen, not quite so coarse—twenty-four lines to the centimetre. The Jacobi screen is essentially one having secondary and finer cross-lines in addition to the main ruling, as illustrated in the issue mentioned above.

Union Terms in Chicago.

THE three-year agreement between the Employers and the Union in Chicago has led to a difference of opinion and postponement of the signing, according to *The Engraver and Electrotyper*. The main points agreed between the parties are :—

"1. That they will promote the good and welfare of the employer and employee alike, and for the best interests of the photo-engraving craft.

"2. That the minimum wages be $21 (£4 7s. 6d.) per week of 48 hours for half-tone photographers, half-tone etchers, half-tone engravers and tint layers; $18 (£3 15s.) a week for line photographers, line etchers, line engravers, routers, blockers, proofers, and printers (half-tone and line). Overtime, over 48 hours a week, at rate of time and half; public holidays and Sundays charged as double time. No work ever to be done on Labor day. $25 (£5 4s. 2d.) to be the uniform scale of wages for night workers.

"3. That apprentices, medically approved, shall be mutually and formally indentured to both parties to this agreement and governed by the laws of the Union, to serve not less than five years in one shop, and then allowed a period not exceeding one year to make satisfactory arrangements with his employers.

"There shall be one apprentice to three journeymen for the first two years, and, after

January 1, 1911, one to four journeymen, or two to seven, to be apportioned among the various branches, one apprentice in a department and additional apprentices to be added only upon the basis of three additional journeymen in a department. There shall be a journeyman employed in every department. Apprentices to be paid first year $3 (12s. 6d.), second year $5 (£1 0s. 10d.), third year $7, (£1 9s. 2d.), fourth $9 (£1 17s. 6d.), fifth $12 (£2 10s.). For the purpose of computing time of an apprentice he shall be considered as entering upon his apprenticeship the 1st of July or the 1st of January nearest the time at which he enters. In night crews there shall be one apprentice to five journeymen, and one for each additional six journeymen."

A meeting was held for the employers to sign the agreement on January 23rd. Objection was taken, however, to the clauses that—(*a*) "Any and all processes of photo-engraving, or part thereof, shall be done by members of Photo-Engravers' Union No. 5, I.P.E.U., and in event of any questions arising as to competency of any craftsman, such questions shall be determined and adjusted by both parties to this agreement"; that (*b*) "no work is to be done by members of the said Union when such required work emanates from employing photo-engravers participating in, or concerned in a strike or lockout with or against members of the I.P.E.U."; and that (*c*) "all further disputes that may arise, not governed by this agreement, shall be submitted to an arbitation committee," etc. The word "further" was a stumbling block; the employers insisting that all disputes shall be submitted to arbitration that cannot be settled otherwise, and not merely disputes beyond the pale of the agreement.

The provision "that any and all processes of photo-engraving or part thereof shall be done by members of Photo-Engravers' Union No. 5," amounts to a closed shop and is illegal, say the employers' committee.

The Union is for a closed shop, legal or otherwise; and its delegates meeting the employers' committee have been as immovable as they have been numerous.

The Copper Question.

The problem of how, where, and at what price the best copper can be obtained for photo-engraving purposes, crops up frequently and in various forms. Even some of the largest dealers are puzzled at times by the intricacies of the market, and probably many engravers are quite at sea. At a dinner of process men which we attended in New York recently, this was one of the two burning questions, and the uncertainty was as apparent as it has been in chats with British and with continental users. We do not profess to have fathomed the whole mystery of the copper sheet business, but we have taken the trouble to make certain enquiries, and we believe the following statements to be the essential facts.

The production of photo-engravers' copper may be divided into two parts, which are practically separate industries, and which are nowhere in the world carried on by one single firm. Therefore no manufacturer, whether British, German, or American, can be held responsible for the whole production of a single sheet in all its stages from the ore to the planished form. The first part of the work (and even this is generally divided between two or more concerns) includes the mining, smelting, refining, and rolling. The second part, the polishing, is a separate line, and is much more complicated and responsible work than the mere word "polishing" seems to indicate.

The production of the raw sheet was a big industry before photo-engraving was invented, and the amount of sheet used for engraving purposes is still very small, relatively to that consumed for roofing, and for the manufacture of tanks, utensils, etc. The great mass of copper sheet, therefore, is prepared for purposes which do not call for the same qualities as are essential in "process" work. The product of various mines and rolling-mills varies in freedom from impurities, freedom from mechanical flaws and defects, uniformity of thickness and hardness, etc. The whole output of certain places, though perfectly good for most industrial uses, is quite impossible for fine half-tone work; and some other brands, which may be fair, good, or very good, in bulk, cannot guarantee that any given sheet, or any given part of a sheet, will be perfect for our purpose. We believe it is a fact that the most expensive sheet copper and the most perfect in the world cannot be absolutely guaranteed until polishing demonstrates whether the sheet is free from impurities and flaws or not.

In the early days the polisher of photo-engravers' copper was obliged to depend entirely upon selection. Certain brands could be eliminated at once for chemical or mechanical faults which applied to the whole product, and which could be detected before beginning to polish. Finding a brand which was suitable on the whole, the flattening, thicknessing, and polishing begins. At almost every stage from the start to the final operation defects are liable to be revealed, which may affect a whole sheet, or a larger or smaller portion of any sheet. And even when the whole process is finished and the work looks beautiful there may still be chemical irregularities that interfere with the perfect etching. The facts that much work may have to be done upon a sheet before it can be rejected as useless; that imperfect parts may have to be cut out and "scrapped" even from sheets that are good on the whole; and that the work done by the polisher does not increase the value of the sheet for other purposes than engraving, help to explain the high price of copper that can be guaranteed perfect. The price depends partly upon the amount of loss, in both labor and material, that is inseparable from the work and yet always uncertain in quantity.

As the selecting of engraving copper from that which is rolled for roofing purposes is unsatisfactory, the establishment of a special manufacture is an obvious suggestion. The difficulty lies in the fact that the plant for such work means a very large capital outlay, and that the cost of supervision and the extra skill and care needed at many stages add to the necessary price of the product. So far as we know, only one firm in the world—the Bridgeport Brass and Copper Co., of Bridgeport, Mass.—has gone to the expense of a complete plant of the best attainable type; and they are in no fear of competition, because they say that the world's consumption of the finest sheet is not enough to justify two such plants. They are great producers of the ordinary or "roofing" grade of copper, but the "Bridgeport" sheet is the subject of special selection and treatment at every stage; with the result that its cost to the polishers is about two pence per pound more than the cost of high-grade roofing sheet.

The Bridgeport Co. does no polishing, but is prepared to sell its finest sheets to all finishers who meet its commercial conditions, which include undertaking not to sell other manufacturers' sheet as "Bridgeport," and limitations of price, both maximum and minimum. While they will not allow one polisher to "cut" against another below the limit of a reasonable profit, they will not permit "fancy" prices to be charged to any possibly unwary customer.

Presuming that the facts are as stated, it would seem as if the sheet-polishers' difficulties were all removed, and the trade made easy. But there is still the pressure of consumers, always wanting the lowest possible price, which tempts some polishers into working selected sheets from the "roofing" quality and offering them at cut prices, a competition which may be perfectly fair and honest, but which naturally troubles the polisher who uses nothing but Bridgeport copper at Bridgeport prices. We say *may* be perfectly fair, because it is alleged that some of the polishers sell roofing sheet made by the Bridgeport Co. but not of Bridgeport quality, while others mix an indefinite proportion of "roofing" with a consignment of real Bridgeport, in each case selling the polished product as the genuine article. Even these things may be done quite innocently in some cases, because the unpolished sheet is not necessarily bought direct from the manufacturers, but sometimes through merchants and brokers, so that even when misrepresentation can be proved it may be impossible to show who is responsible.

The obvious remedy for these troubles would be some form of brand or trade-mark, but it seems impossible to devise one which can be applied to all parts of the original sheet and which will not impair its value. A stamp impressed at the edges or corners is of little use, as a large proportion of the copper is sold in sizes much smaller than the full sheet.

While the "Bridgeport" copper can be identified this is only possible by delicate test with an elaborate and expensive installation for electric resistance testing, such as could not be installed by the photo-engraver, or used with accuracy by anyone likely to be employed in a process house. The result is that the Bridgeport Co. sees no way to protect itself and those who wish to use its products in the finished form, except by refusing to supply its special brand to polishers who may be found to sell substitute or mixed sheets as Bridgeport, and by advising those who wish for this particular brand to insist upon a full and unequivocal guarantee from their dealers.

As the finishing, thicknessing, planing and polishing is a class of work that seems well suited to the artificers of our own country and the European Continent, surprise is often expressed that the American polishers hold so large a share of the market. This is due to no lack of enterprise on the part of the folk of the old countries, but to the fact that even the most perfect copper contains sheets or parts of sheets unfitted for photo-engraving, with defects that can only be discovered in process of polishing. It is very difficult to obtain a market for the throw-out at anything better than old metal prices, except by returning the faulty material to the manufacturers. This is practically impossible for polishers in the old countries on account of the heavy import duty or, alternatively, the very serious Customs trouble and expenses which fall upon the man attempting to re-import American manufactures "improved" abroad. These, added to the freight on the returns, would make serious items for any European polisher.

Brevities.

ERRATA.—Page 64, col. 2, line 24, for "cotton" read "a cupboard"; page 66, col. 2, line 1, for "9-volt" read "·9 volt."

COPPER PROFITS. — Calumet & Hecla's quarterly dividends are now running at the rate of $5 per share, on shares of which only $12 has been paid up.

BLOCKS MOUNTED TO EVEN PICAS, as demanded by Mr. Riddell, are already specialties with certain process men, and probably every block-maker would adopt the idea if a dozen separate customers asked him to do so.

BRIGHTEN UP YOUR ADVERTISING, is the advice of the *Dry Goods Review*, Toronto. Canada, to its readers. To help, it offers fashion electros of all the latest styles; half-tones at threepence (six cents) per square inch; and line work at twopence (four cents).

ANILINE DYES are the subjects of a price-list just issued by Fuerst Bros., 17 Philpot Lane, E.C., as agents for Meister, Lucius & Brüning of Hoechst. Engravers who are experimenting with color-filters, etc., should send for a copy.

CAST-IRON GRAINING-BALLS are used by the Gillin Litho Company in preference to glass, porcelain, or wooden balls or pebbles, for graining the surfaces of zinc and aluminium plates for lithography. Their results are said to be some of the best obtained by any firm.

COPYRIGHT AND LABOR.—Senator Kittredge, at the request of the I.P.E.U., has introduced a short bill into Congress providing that copyright shall not be granted in the United States to publications in which the illustrations are not printed from plates made in the U.S.

"REGISTER."—Under this subsection of his address (p. 80), Mr. Riddell seems to be tilting at a fault for which the original, and not the engraver, is responsible. If his trouble is simply the fineness of the screen, again the engraver is blameless, for he merely carries out his client's order in this respect.

THE STRONG ROOM for the protection of valuable originals from fire, flood, and burglary, is daily becoming more necessary to the photo-engraver. John Swain & Sons have just completed a great room of this type at Barnet, and devote two pages to it in the current *Swain's Quarterly*.

BOSTON HAS GENEROUSLY voted to pay the "tuberculosis" subscription to the I.P.E.U. for a year in advance. The dire need of the sanatorium work was brought home to this branch by the death of one of its members just as he was to be moved. Six months earlier and his life might have been prolonged for many years.

THE WHITE PLAGUE.—Four members of the I.P.E.U. have been sent to a tuberculosis sanatorium as a result of the recent determination to fight consumption. A fifth, too far gone to stand the travelling, is being cared for in a separate sanatorium nearer home. A sixth, for whom a resolution was passed, died before he could be removed. These bare statements show the real necessity that existed for the beneficent work.

THE ANNUAL DINNER of the Press Etching Company was held at Anderton's Hotel in the heart of printerdom, on March 5th, and was notable for the reminiscent yet optimistic speech of Mr. R. A. Cheffins from the chair. While he looked back with regret to some of the good old prices of the good old days, he cheered and encouraged his associates to keep up to date and fully alert, assuring them that with new ideas and improvements always coming along, the craft would remain bright and interesting.

"AN ABSURD PARAGRAPH" on page 34 of the February issue of this journal rouses the ire of a reader, who tells us that zinc was used in lithography over a century ago. We know of this early use of zinc, but the paragraph in question had reference to the use of a name, not of a material. That name has become extensively known as denoting one thing, and to use it indiscriminately for two totally different things is misleading. It is also unnecessary, as there are well established terms other than "zincography" for nominating lithography from zinc plates.

AN INQUIRER SATISFIED.—A reader in Switzerland asked us questions about etching silver which seemed to need a longer answer than could be given in a note. We therefore arranged for Mr. Van Beek to reply in an article (p. 65). The correspondent, in thanking us for the information, says:—"I have tried the process and find it very sasisfactory."

Almost every issue contains one or more articles that are of great value when you happen to want them. If they do not appeal to you now, make notes of them, file your copies of the *P.E.M.*, and have them bound at the end of the year.

HENTSCHEL AS INNOVATOR.—Mr. Carl Hentschel introduced a novelty into the Court of Common Council on March 18th by sending a printed copy of his speech to every member of the Committee, and by moving that the speech "be taken as read." His recommendation was that the election of aldermen of the city of London should not be for life, but that they should be retired at the end of five years after passing the Lord Mayoral chair. He showed that most of the Lords Mayor had been aldermen for from twenty-three to thirty-four years before rising to the higher dignity, and contended that only the best years of a man's life were good enough for the service of the greatest of Cities.

AMERICAN LITHOGRAPHY is making a strong, organised appeal to Congress for a higher tariff, to enable the trade to maintain itself against the competition of low-wage foreign workers. The appeal, with briefs before the Committee of Ways and Means, and other matter, is published in a pamphlet which calls upon all interested in kindred trades to use their influence with their own members of Congress. One of the full-heads in the brief reads:—"Germans Have Captured the Market," and extensive arrays of figures are set forth. One table shows that the imports declared as lithographic prints amounted to $799,475 in 1899 (the first year for which figures are available) and to $4,911,102 in 1908.

THE STROEGER TRANSFER INK, mentioned by Mr. Guy Symmons on p. 75, can be tested quite easily and economically, for the makers put it up in sixpenny tins as well as in shilling and three-shilling tins—postage extra. One of the difficulties in the way of testing unfamiliar materials lies in the reluctance of manufacturers to supply small quantities. Free samples are not necessary, but many a man hesitates to buy several shillingsworth of something which can be tried with a very small quantity, and which may prove useless for his particular purpose, though he may become a regular buyer if it proves satisfactory. Free samples are often abused; but small trial outfits, at low (and preferably post-free) prices may prove very advantageous to both maker and user.

A SCHOOL FOR THE PRINTER OF PROCESS BLOCKS.—In opening his lecture at Bolt Court, Mr. J. R. Riddell said that he felt greatly honored in being asked to address the home of research in photo-mechanical processes; an institution with a world-famed reputation, doing work which must be of value to the photo-engraver, enabling him to put "process" on a scientific and practical basis, and one which must ultimately assist the printer in satisfactorily turning out the engraver's artistic production. But he failed to understand why the institution was not also open to the process printer, for who more than he requires to get in touch with the engraver? Each would then appreciate the other's difficulties, and it would be very helpful to both to have the benefit of an institution for the exchange of views.

BLOCK MOUNTING.—In a letter on another page Messrs. Dent & Co. tell of the precautions they take in preparing wood for block-mounting, and in former issues we have mentioned similar efforts by certain other firms, to all of whom be all possible praise. To make the mount impervious all around it is necessary that the sides shall be varnished after the final trimming, and this is especially important for the end grain sides, for the end of the grain is often very thirsty for moisture, and hardly to be stopped by a single coating of varnish. Again, however carefully the wood is thicknessed there is always the chance that some blocks may be just slightly more than type-high, in which case the printers use the plane, and away goes the varnish from the bottom. Even if the block is absolutely type-high at the start, it is sometimes unmounted for interlaying, and this gives another excuse for planing the wood.

Wood is pretty good, or good enough, when used by a careful block-maker and careful printers; and if it never gets into the hands of a careless p. d. But the real final solution of the mounting difficulty seems to be the adoption of the metal mount in some form, by the printers, or the finding of some impervious substitute for wood, by the block-makers.

Specimens and such like.

"WALTONES" is the distinctive name given to the half-tones of the Inland-Walton Engraving Company, of Sherman Street, Chicago.

THE MEZZOCHROME PROOFS IN COLOR are described and illustrated by miniature half-tones, in a booklet obtainable from the Fine Arts Publishing Co., Ltd., 29A Charing Cross Road, London, W.C.

"CAN WE INTEREST YOU IN HAND-COLORING?" is the query of the Red Lion Art Co., 30 Gray's Inn Road, London, W.C., who undertake air-brush coloring of half-tones, collotypes, and all other kinds of prints for publication.

"THE WORLD SHALL HEAR IT" is a well-worth seeing booklet from Smiths' Printing Co., Hutton Street, London, E.C., who describe themselves as "professional proclaimers"—promoters of publicity. The booklet contains ideas.

"NOT TWO PRINTINGS, BUT A TWO-COLOR EFFECT," is one of the lines specially pushed by the Eclipse Engraving Co. of Cleveland, O., who speak of it as the "high-light process, the two-in-one engraving." The effect of good black text, with initial rubrication and border-work in half-tone, can be used very advantageously in much display matter, and, as in the specimens, can be printed from one block, made from one drawing.

GEORGETOWN, BRITISH GUIANA, has an enterprising printing and process firm in the estate of C. K. Jardine, deceased, publishers of *The Daily Chronicle*, and producers of much fine half-tone work in monochrome and three-color. Amongst their specimens, just to hand, are picture post cards, desk blotters, calendars for the pocket and for the desk, and other classes of stationery, decorated with excellent local views, or with color reproductions of native types, in all the richness of native costume modified to modern taste, and with brilliant backgrounds of sunshine and trees. The work throughout is very good indeed.

THE MEZZOCHROME COLOR-PROOFS which are being published by the Fine Arts Publishing Co., Ltd., 29A Charing Cross Road, London, W.C., have a very great technical interest, in addition to their pictorial charm and value. They are the first machine-printed photogravures in color to come upon the general market. The series comprises twelve subjects, at present, printed from plates about 22 by 15 inches on heavy plate-paper 33 by 28 inches. The subjects are varied and popular, and all the originals are the works of good artists. A very fine half-tone screen grain is visible when portions of the pictures are closely examined, suggesting that the method of printing is that already applied so successfully to monochrome by the Rembrandt Photogravure Co., of Lancaster. The publishers are not prepared to say anything as to the method of application of the colors: but, having mastered the great initial difficulties of printing photogravure by machinery, the differential inking of the plate, or the printing of a number of color-plates in register, seems a relatively easy problem. The man who successfully removed the difficulties imposed by the mechanical wiper, or "doctor," could tackle almost any technical poser.

The resulting prints are handsome objects of home decoration, and have great historical interest as marking an important step toward the illustration method of to-morrow.

Business.

"THE ONLY DIFFERENCE between the square inch scale of prices and the one founded on cost of production is that in the one the employer makes a profit and in the other he is willing to pay for losing money."—*The American Photo-Engraver*.

THE EMPLOYER WHO NAGS, LOSES MONEY.—The foreman who frets and fumes loses the time and respect of the men. Workmen who are "off-color," irritable and uncertain, lose time and money—their own or some one's. Hence, health is the first wealth. Sound sleep and steady nerves are *business* assets. All dissipation has to be paid for by someone. And consistent overtime is wasteful folly.

THE ECONOMY resulting from the American method of stripping a large number of negatives to print, etch and finish from them in "flat" form, is commended by Mawson & Swan, Ltd., in a recent circular. They claim saving of exposure time—from not needing mirror or prism—ease in storing the negatives, and freedom from breakage, in addition to the advantages generally stated for this style of working.

A Canadian factory has just been established at 1 Mincing Lane, Toronto, by Sinclair & Valentine of New York, makers of fine printing inks, who specialise on inks for lithography for fine half-tone and trichrome. The establishment of Canadian factories by firms from the United States is one of the signs of the times, indicating that our American cousins recognise the coming and the great development of Canada.

Mr. Henry Blaikley (formerly of 34 Barbican, E.C.), who for over six years past has been representing the well known firm of Vaus & Crampton, Ltd., lately renewed his agreement with them for a further term. The general excellence of the work of the firm is well known, and the steady increase of their business is reported. Mr. Blaikley was one of the most earnest workers in the direction of co-operation for price maintaining, when that burning question was prominently before the trade; and he introduced several special lines in fine engraving work which were well ahead of the technique of their time, though the general level has since come up to or passed them.

Correspondence.

BLOCK MOUNTING.

The Editor, "The Process Engraver's Monthly."

Dear Sir,—A well known firm of art printers recently issued a letter to the Press complaining of the uneven mounting wood used by process engravers, and talked learnedly of "badly seasoned" wood.

As we have given much thought and study to the wood problem, perhaps we can throw some light upon the subject. Unevenness of mounts is due to the wood losing its moisture when cut, and shrinking unequally when subjected to the high temperatures of printing factories.

Process engravers endeavor to purchase the best seasoned wood, but "seasoned" is a trade term, and applies to wood equally as "new laid" applies to eggs—it has an elastic meaning.

Timber merchants are unable to supply perfectly dry timber, as wood absorbs moisture from the atmosphere in transit, therefore it remains for the conscientious process engraver to prepare his own wood artificially. This of course can only be done economically in large quantities; and recognising that fact we installed a drying room where large consignments of unplaned boards are racked for weeks, with spaces between, while an automatic contrivance gently extracts every particle of moisture out of the wood, and it shrinks as far as possible; and according to tests we have made, it is surprising how much comes away from the most "seasoned" of timber and the extent to which it shrinks under our treatment.

This alone, however, is not enough, for the wood is still capable of reabsorbing moisture, so the boards are taken from this room as wanted, put through a thicknessing machine and immediately coated with a varnish which prevents atmospheric or other moisture re-entering.

Printers buying half-tones mounted on unvarnished wood should guard against using wet paste on the backs, as it tends to swell the wood and cause warping.—Yours faithfully,

A. E. Dent & Co., Ltd.

"THE WISH TO UNDERSTAND."

The Editor, "The Process Engraver's Monthly."

Sir,—I have read with somewhat mixed feelings the short paragraph headed "Apathy of Process Workers" in the March number of the *P.E.M.* and venture to make a slight protest against this sweeping statement:—"I cannot blame the lecturer or his subject-matter; it seems that the trade has not the *personnel* at present that wish to understand the fundamental principles that underlie the work."

It must doubtless be a great disappointment to the Principal of Bolt Court School and the many excellent lecturers to find so few process men in attendance, and it would be well to try to find out some of the causes of the apathy displayed. I think the principal one is the ridiculous amount of overtime indulged in by the trade. Allowing for a certain amount, which in a trade like process is undoubtedly necessary, surely a large amount of it ought to be avoided by better management or larger staffs. There are doubtless some employers who encourage their men to obtain a better understanding of the principles underlying their work, but they are few and far between, and the majority of employers are indifferent, so long as their men can execute with great speed the particular work they are paid to do.

Again, no process worker can call the evenings his own: he is supposed to be always anxious to "rush out" work—morning, noon, and night, and sometimes week-ends; and few men would venture as a reason for getting away at the proper time that they wished to attend a lecture at Bolt Court.

This state of things has a demoralising influence on the men; they get into a rut, and the efforts necessary to get out appear too hopeless to be attempted. The spirit which enables a man to work hard at a thing all day and a large part of the evening, and then to spend his scanty leisure studying fundamental principles, is given to very few, and even those few become disheartened when time after time they are baulked of attending a lecture which they had hoped to hear.

The existence of so many books on process work and your valuable little monthly surely proves that "the wish to understand" is there—and that the poor attendances at Bolt Court School are largely due to lack of opportunities to attend.

I think, sir, that it would be very interesting to have some of your readers' opinions on this important subject.

Wishing *The Process Engraver's Monthly* every success.—Yours faithfully, A Fine-Etcher.

WET PLATES v. DRY.

To the Editor of "The Process Monthly."

Dear Sir,—I have heard and read so much of the advantages of dry plates for process work, and judging by the numerous articles about them, they are held by some to be the acme of perfection. Poor old collodion wet plates are objects of ridicule and reckoned to be altogether "old-fashioned" and out of date. No one seems to put in a good word for an old friend, so here goes to back him up to a certain extent. Yet it is used by the great majority of process houses, and there is no doubt that the finest work is done on the old-fashioned wet plate. Take the latest *Process Annual*, where you see the best work of all processes, look for a machine-negative, taken on a well known make of process plate. Now compare it with the other machines (that have evidently been done by the old-fashioned process) in the same book. I think any man who knows both methods, and who is not prejudiced, will say that collodion still has the advantage. The general effect is dull (that is, taking it to be the best of its class, and comparing it with the best of the others), the gradation and detail in the lower tones is lacking.

I have had (as many have) my experiences with both methods of half-tone negative-making. A few years back I took a berth as half-tone operator on dry plates. After my first week I was told my negatives were very satisfactory, and everything went "all serene"; so I concluded I was an expert dry-plate worker, and as I preferred working dry plates to wet, I tabooed the subject of wet plates.

Now the employees in this firm were all used to dry plates, some of them had never worked from a wet plate. My employer used to say, "This is an up-to-date firm with up-to-date methods. No old-fashioned wet plates for us."

After some time I accepted a berth in a firm that had never used dry plates, and wanted to be up-to-date, etc. But, sad to relate, my fine negatives were termed rubbish! no good! not even printable; and to my disgust, I had to fall back on the despised wet plate again. I am living in hopes of being an expert dry plateman again in the near future. To my mind, being experienced with both processes I think dry plates are worked at a disadvantage. You can only get a reproduction of the copy; that's all right if the copy is good, but it is seldom you get a real good copy, and flattening or brightening the negative is not always sufficient for the best results.

Now on a nicely exposed wet plate intensified with copper and silver and bleached with iodine (in the white, as we say) a good operator who knows his business can, in a few minutes, with cotton-wool and a fine soft brush, locally reduce, here and there, and bring out as much detail, also do any evening-up that may be necessary that would take a good etcher four times the time. I have never been able to successfully locally reduce a dry plate; any faking, working-up, or evening, has to be done in the exposure or fine etching. Result is nowhere equal to wet plate. If a method is discovered of bleaching a dry plate, so that in the case of an indifferent copy it can be worked the same as wet plate in reducing, then the wet plate will take second place. But at the present time, in spite of what many say, wet collodion plates stand first, and the best work is done on wet plate.

B. H. P.

COMMERCIALISM; AT BOLT COURT.

The Editor, "The Process Engraver's Monthly."

DEAR SIR,—May I once more trespass upon your generosity for space to reply to "Polly Chrome"? (page 72).

With great interest I read his remarks, yet grieved that a person of such vast intelligence should have so misunderstood the lecture as to imagine I was attempting to lay before the audience a system which should enable them to know what to charge for their work. What I was endeavoring to do was to point out how and where leakages of profits can take place, and impress upon everyone the importance of checking such points to see that such leakages were not going on. "Polly Chrome" somewhat scoffs at my recommending everyone to check accurately each department so that they shall know exactly which has been, or is, making or losing money. He asks, "What business of any importance is being conducted otherwise?" May I ask him first how many businesses are there that are not of importance to someone? Then again, how many businesses are there that are at the present time conducted on the lines mentioned, and how many of these few businesses that are conducted on such lines could show definite proof that the method they were using was really giving them the returns they were seeking? If "Polly Chrome" had *his* business properly organised and analysed he would not ask for advice as to what to charge his customers for blocks; he would know. If a firm have their business under proper control they know only too well what they should charge.

"Polly Chrome" seems to object to me asking the audience to think, and remarks that "*brains* are evidently only produced in Birmingham." If for one moment I had thought that my audience as a whole were not in possession of at least the full average amount, I certainly should not have asked them to try to perform any such painful operation as thinking.

He accuses me of saying that I am not able to get at the cost of any individual job that goes through our works, also of saying that I had not wished to know such cost. It may interest him to know that I can at any moment ascertain the cost of any job that is going through, either cost up to department it is in or total cost when finished, and, what is more, prove that such cost is accurate.

He says that I believe in putting all work into the common stock pot and make up large flats. This I did not say and do not believe in, except in the case of line work. Half-tone in particular certainly could not be handled in this manner if good reproductions of copy are to be supplied. He is, however, quite right when he says that I advocated that if by chance a firm finds any particular line of work unremunerative, decline it or improve the method of production.

"Polly Chrome" somewhat ridicules the idea of any possibility of charging artist work at per square inch, then informs us in the same paragraph that he is acquainted with a firm who have been doing it for thirty years past and find it most successful. The only drawback to him seems to be that they have no provision made which would allow of full play for the artists' imagination. "Steady thy troubled soul, good Polly," for in my scheme I have made full provision to allow of all the best talents of the artist to be developed wherever such talents are needed and likely to be appreciated.

"Polly" objects to me saying that the photo-engraving business is one of *reproduction*. May I ask him what else it may be? I have been under the impression for quite a number of years that one thing that made photo-engraving come to the front was the fact that by the process the artist could get his drawings *reproduced* and all his personal characteristics of touch retained, which was an impossibility by such methods as wood-engraving, etc. Of course there are copies which have to be improved upon in copying; these naturally receive the particular treatment that is requisite to produce blocks to the satisfaction of customer.

"Polly" again says that if he were a user of blocks he would hesitate to place his orders where the artistic instinct did not prevail. May I be allowed to suggest to him that he would most probably be very human over the matter, and do very similar to what many other block users do—that is, place his orders where he could obtain the right thing at the right price.

I am pleased to see someone taking the trouble to write on the commercial side of our business, for I feel that a lot of good is to be done by so doing, but I am sorry that any writer should be so ashamed of his effort that he is afraid to sign his own name to it. Be a man, "Polly Chrome," and let us know who and what you are.—I am, yours faithfully, ARTHUR COX.

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"The Process
Photogram"

THE PROCESS
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Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly.*

Applications of Photography to Lithography.

By Mr. Guy Simmons.

(A lecture delivered at the Bolt Court School of Photo-Engraving.)

(Concluded from p. 75.)

If necessary, wash the plate out and rub up, bringing the ink in nearer contact with the plate; but I may say we have never been troubled with the image leaving the plate, so long as the coating is kept thin, and this is the reason why so much white of egg is used and so little fish glue. I am quite sure everyone who tries this process will find it extremely simple and very useful.

In half-tone practically the same process is carried out. The coating, cleaning and printing take the same, but greater care should be taken with the drying; and I can strongly recommend the idea of blowing the plate dry, as in this process nothing whatever comes into contact with the plate, and the plate will roll up perfectly clean.

There are many processes on the market claiming advantages such as the high-light method, which has advantages over the ordinary process.

To work in detail: The negatives are taken through the color-filters, and any color rendering not considered to be good worked up to correct, after which screen transparencies are made, each process giving the high-lights more closed up. The four negatives are made—yellow, red, blue, and black, changing the screen each time. These negatives are next printed on to aluminium or zinc, generally printing two from each, one very much over-printed for light tints, and the other correctly printed for the heavy color. These plates are treated the same as a line plate, but with greater care, also the transferring will give trouble unless it is thoroughly mastered by a good man. The plates are rolled up and printed in their respective colors.

In a large amount of work seen to-day only one or two plates are made by the half-tone screen, and for this an orthochromatic negative is taken, a screen positive made from this, and a contact screen negative again made, keeping all the detail possible. From this, two aluminiums or zincs are printed, one to be used for the litho artist to make his key from, the other to print in black after the artist has drawn his colors. The plate for the artist's key is fully printed, and after drying is coated with a good varnish, so that the artist can draw with litho ink on the varnished plate, and off-sets can be taken from it and put on to stone for the artist's guide, and in this way everything must be the same size. The other plate is rolled up and proved to show what the black will do on top of the hand-drawn colors.

The same thing can be done by printing the black plate from a block on the top of the colored litho by a type-printing press, this method giving a very sharp result; that is, the half-tone block is made first, fine-etched and finished, a good proof taken. The artist will make his key to this; he will draw his colors in whatever color he thinks will suit the subject, then some proofs are pulled from the block, and the litho artist has his colors put on the top of the black to guide him. Also some proofs of the colors are taken so that the black can be put on last and the result examined to see which gives the best results. This black block gives very good results—often pulls the whole picture together.

Very often when there are many screen colors to go on top of each other they give a nasty pattern, and this can be overcome entirely by using the following method, which needs only one screen, that is, the red and yellow screen of three-color ruled at 15° and 75°. With one screen any number of colors can be put on top of each other without giving any pattern whatever. Focus up your subject and get all ready. Having decided upon your screen-distance, exposure, and stops, coat and place your plate in the slide, clean and put your screen into position as you would for your yellow printing plate. Now draw your slide and pull your screen back into position and give half the required exposure. When finished, close the dark slide and lift out the camera, turn the screen round the opposite way—that is, with the red printing side facing the lens—and give the second half of your exposure, finally developing. You can do the same with all your colors, and by printing them on top of each other you will not get any pattern. It is not necessary to take care to put the screen back into the same position, as it does not seem to have any effect upon the result. Also with this pattern it is easier to add to and take away without showing so plainly. Also it mixes with the regular ruled screens and does not show the slightest pattern; that is, the yellow can be done off this double screen, the red on the 15°, the blue on the 75°, and the black on the 45°, and in this way you can make four-color litho or blocks the same size as your screens, which is a great saving. It is absolutely unnecessary to get a fourth color screen.

✓ Three-color Litho by Screen.

This process, although having been tried many times, does not seem to be a great success, owing to the difficulties in transferring and the printer being not able to carry enough color required to get the depths. For this reason it is usual to use five colors, or to print a black first and then colors on top. The screen negatives are best made by the high-light process or indirect method, so that the first negatives can be worked up by the artist, and again the transparencies can be worked upon. The screen negatives can then be made, carrying the high-lights fully up the scale, as the great difficulty with this process is reducing the size of the dot and at the same time keeping it firm and sharp. I can see this difficulty being overcome by the use of a cold enamel on zinc; that is, first coating the zinc with shellac and dragon's blood dissolved in ether or methylated spirit, then coated with fish-glue, exposed, printed and developed in the ordinary way. This red shellac solution can be bought from Messrs. Penrose & Co. It is called the "Redcol" process. Clean the zinc plate in the ordinary manner with flour emery or fine pumice powder, then wash it well under the tap. Place the plate on the whirler and whirl dry, allowing the plate to get sufficiently warm so that you can just bear your hand to touch it. Then pour a pool of the No. 1 or "red" solution in the middle, allowing sufficient so that when whirled it will cover the plate. Immediately whirl rapidly in the sink or suitable place. This operation must be done quickly, as everything depends on the quickness in getting a thin even coating, which should be very brilliant in appearance, and should dry almost immediately with a high glaze. It must be perfectly dry before putting on No. 2.

Now flow over No. 2 solution or second film which is a solution of fish-glue; to coat with this solution it is best first to rub the coated zinc with a piece of cotton-wool dipped into a diluted solution of fish-glue about 5 c.c. in 100 c.c. water after washing under the tap, and No. 2 solution will coat evenly all over. Having coated with No. 2 solution the plate is whirled over a gas stove, but must not be made hot, as the two films may contract or expand, and small cracks appear over the No. 1 coating.

When dry, place on the negative and print in the ordinary manner. The time of printing is about two minutes according to strength of light. When printed, wash under water tap and dye the plate up in the usual manner. Wash the dye off, when a faint image should be seen. Now place on the whirler, and whirl over the stove till dry. When cool but dry, place the plate in a dish of developer, but do not let it remain in it. Lift it out immediately and put under a powerful flow of water, washing back and front well. With a camel-hair mop, next brush the plate well over whilst under the tap. A little pressure may be used without injury. It will now be found, when brushing, that the second film is being removed, leaving the first or "red" film on the plate. This is permanent, and cannot be removed without the use of methylated spirit or potash.

When the plate is dry the process is complete, and the image will be left as a shellac resist. A very dilute solution of methylated spirit or some substance which will not act upon zinc but will act upon the resist will reduce the size of the dots and give the litho artist, or better still a three-color etcher, nearly as much scope as he has upon blocks. The plate can be cleaned and work added by medium or stipple, afterward etching with litho zinc-etch, and this shellac resist will take the ink and roll up in the ordinary way.

Inks for Half-tone.

Abstract of a lecture at the Bolt Court School by Mr. C. I. Smythe, of Messrs. Mander Bros.

(Continued from p. 79.)

DRIERS AND DRYING.

THE most frequent demand is for process ink that will dry quickly on paper, but not on the machine, so it may be useful to devote a few words to the subject of ink drying. What do we understand by the drying of printing ink? Obviously, that the printed matter shall no longer be sticky and tenacious, but sufficiently hard to enable one to pass a hand over it without smearing in the slightest. The portion of the ink that has to dry is the medium, the coloring matter being itself dry, and this medium dries mainly in one of two different ways, or by combination of the two:—Firstly, by oxidation; that is, the linseed oil varnish gradually absorbs oxygen from the air, and is converted into a dry, elastic, transparent body, and this oxidation will take place equally rapidly on all smooth neutral surfaces, so that an ink which depends entirely on oxidation for drying will be certain to dry almost as rapidly on a machine as on paper. Secondly, the ink can dry by absorption, that is, by being gradually absorbed into the pores of the paper, just as writing ink is absorbed into blotting-paper, though more slowly. The more fluid the ink and the more porous the paper the more quickly will this absorption take place, and an ordinary newspaper is a very good example of this kind of drying. An ink which dries in this way alone, without oxidation, will not dry on the machine or rollers, which are non-absorbent. On the other hand, such an ink would be totally unsuitable for a paper of a hard, non-porous character.

The only other ways in which it is possible for a printing ink, or indeed any other body, to dry, are by evaporation or solidification. In the former case we should have to assume that the ink contained a volatile constituent capable of evaporation, which would, of course, be quite as liable to evaporate when on the machine as on the paper. As a matter of fact, bodies of this kind, such as benzoline or turpentine, are frequently added to inks by the printer himself. Their action, however, is mainly in assisting in the quick absorption of the ink into the pores of the paper.

Solidification, in the sense in which water solidifies to ice, is practically out of the question as far as printing inks are concerned.

It is by a combination of absorption and oxidation that all half-tone process inks are made to dry. Special conditions require special inks, and if a printer requires an ink that will dry on the paper and will not dry on the machine, the first consideration is, What kind of paper is to be used? If very hard and non-porous the demands cannot be fulfilled. Fortunately, however, most of the so-called art papers are heavily coated with substances which form excellent absorbents for the ink.

INK REDUCERS.

The presence of this coating, however, assists the ink maker in one way, only to embarrass him in another, for many coated papers, especially if at all damped, present such a tender surface that ink of any considerable viscosity tends to pull the coating from the paper. This presents a considerable difficulty, as viscosity is essential in an ink intended for fine half-tone, so that the exact degree of viscosity must be obtained in order to avoid "plucking," and to ensure clean sharp impressions. As a rule the ink manufacturer sends out his process ink suitable in both these respects for the ordinary kinds of coated papers, but it occasionally happens that the coating of a paper is so weak that the ink must be manipulated by the printer before use, to avoid "plucking." This is often done by the addition of grease or fat, and there are, in fact, almost as many methods of treating the difficulty as there are printers. Generally the addition has a deleterious action on the drying property and on the body of the ink.

To meet the demand for a satisfactory emollient, the firm I represent have introduced an article called "Adinol." This article has a remarkably powerful action in softening a too viscous ink and preventing all tendency to "pluck." At the same time the drying of the ink is in no way retarded by it, but in the case of slow-drying inks, actually increased; and it is necessary to use so little of it that the body and strength of an ink is practically unaffected. It is particularly suitable for half-tone inks, and may with advantage be used for three-color work.

ing the grain as would be done with a metal scraper.

Immediately after having strongly passed the hard pencil over the places to be retouched, spread over them with the finger a little machine black (or colored ink) if the retouching is done on the machine in the course of printing; the ink adhering to the metal, the retouching will hold firmly.

When there is a defective part on transfer, it is replaced by a partial transfer, that is called patching. To do this, after having lifted in the benzine the part to be changed, it must be rubbed with a polishing felt, heavily charged with pumice powder and a little water. This operation, which corresponds to a hand graining, should be done with sufficient care not to disturb the adjoining parts. The rest of the plate should have been gummed previously; when the plate is sufficiently rubbed we patch as if working on stone.

PRINTING AND PRESERVATION OF PLATES.

There are no special inks for aluminium. The colors commonly used on stone can be used: with one difference, however—that all inks used on aluminium should be thoroughly ground. Insufficiently ground inks contain granulations, which injure the surface of the metal and de-prepare it, as if with pumice powder.

As regards printing, the differences with stone are these—1st, the necessity of thorough damping, the metal not being porous; 2nd, to use only grained rollers, and preferably machines with geared rollers. If the inking rollers are turned only by contact with the printing surface, they produce the slurring well known to lithographers, so much the more positive as the grain of the roller is fine. This slurring makes the stone glossy after seven or eight reams, and renders a new preparation necessary.

As even porous stone into which the acid has penetrated deeply is glazed by this kind of inking, it is easy to judge what takes place on a metal where the effect of the acid is only superficial. The plate rubbed by the friction of the rollers which it is obliged to turn becomes de-prepared at the end of a ream or even less.

In a well-constructed rotary machine there is, on the contrary, no slipping, the metal no longer has to turn the rollers; it is the machine which moves them, and the damping rollers. The plate, no longer enduring rubbing, can in this case be used for a very long run.

OXIDATION.

Aluminium does not oxidise in dry air, but in water when evaporation takes place too slowly. It is enough to be warned in order to avoid this inconvenience, for which there is no remedy. An oxidised plate should be put in the grainer again; not that it is injured as a plate, but because the work is irrevocably lost.

A simple precaution can completely avoid oxidation; never allow a plate to dry of itself. It is always necessary when drying of a plate is desired, for whatever reason, that it should be done rapidly, whether by the hand fan dear to all lithographers, or by any other means—*e.g.* warm table, etc. With the machine at every stop raise the dampers, gum the plate, wipe it and dry quickly. By leaving the dampers lowered at night when the machine stops, it will be found next morning that there are holes wherever there is contact. The fear of oxidation is the beginning of metallographic wisdom: the plate is covered with myriads of little white dots of aluminium taking the ink without remedy, almost insoluble in the acids we are able to use. If oxidation were caused at the edges or any part where there was no drawing, it would be easily removed by rubbing with a felt polisher or pumice powder; the portions thus cleaned could be very easily re-prepared. Besides this, if oxidation be very recent, the plate can sometimes be saved by inking it and passing the preparation over it, using a wad thoroughly saturated. Oxidation is always caused by negligence; it only surprises the thoughtless.

Erasure and Graining.

An aluminium plate $\frac{6}{10}$ths of a millimetre can endure seventy-five to one hundred erasures without losing an appreciable fraction of its thickness, and can, as an extra bit of consolation, after it has served for a hundred different works, be utilised as a matrix for the preservation of the work. Erasure is the indispensable work preceding graining. This operation—half-chemical, half-mechanical—clears the plate of all greasiness so that it can be in proper condition to receive the action of the grainer. To cleanse the plate perfectly, use petroleum or the essence of terebenthin and pumice powder. When the plate is thoroughly cleansed from color apply benzine or mineral spirit to finish the work. Finally, rub the plate with polishing felt and pumice powder wetted with the erasure solution—

Nitric acid - - -	60 c.cs.
Hydrofluosilicic acid - -	100 ,,
Water—enough to make -	1 litre

and wash the plate well to remove all trace of acid. Then put the plate in the horizontal grainer, working with an oscillating circulatory movement, in which the plate is fixed face upwards. Place on the plate wooden or glass marbles as required, so that the plate is entirely covered—a slight excess being better than an insufficient number. Add the graining material (pumice, silex, according to the case), and use a little water so as to form a soft paste.

Set the grainer moving (normal speed 180 turns per minute), and leave the plate forty-five minutes (an hour and a half if it be for a new plate, not yet grained), adding a little fresh powder at the beginning of the last quarter of an hour. Remove the plate from the grainer, wash it thoroughly under a powerful jet so as to completely eliminate the powder, which, remaining at the bottom of the grain, would be an obstacle to the solutions and inks to which the plate is to be subjected. After washing, drain the plate immediately and dry it quickly before the fire to avoid oxidation; use for this drying no sponges or linen, even the best. The marbles should be washed in water after each graining, and the grainer every time the grain is changed. It is necessary to possess enough platės so that each is always used for the same grain when determined. During the working of the grainer all the marbles should move about. If it happen that a certain number of them do not move, they become covered with a mass of graining matter. To make them move, add a little water. To avoid this trouble, add the powder gradually, distributing it evenly. Here are the descriptions of the five grains necessary and sufficient for the execution of any work:—

Grain 00 for very fine transfers: use wooden marbles and very fine pumice powder. Grain 0 for ordinary transfers: use wooden marbles and coarse pumice powder. (Grains 00 and 0 are used exclusively for transfers.)

Grain No. 1.—Glass marbles and silex powder passed through sieve No. 80.

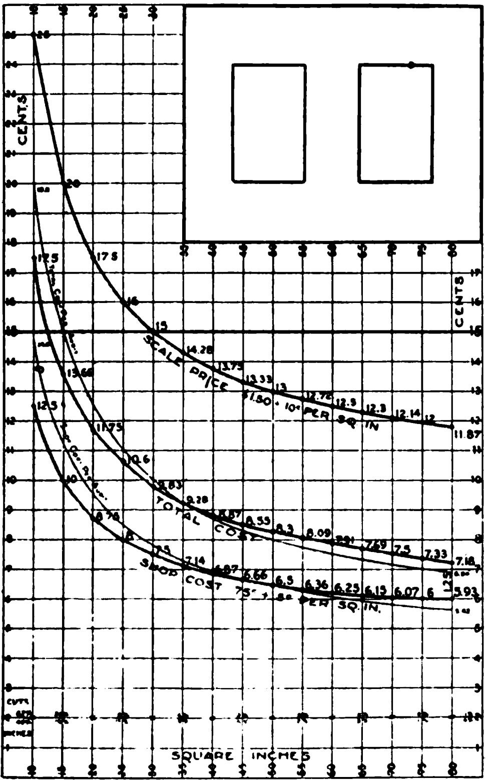
Grain No. 2.—Glass marbles and silex powder passed through sieve No. 70.

Grain No. 3.—Glass marbles and silex powder passed through sieve No. 60.

Grains Nos. 1, 2, and 3 are used for posters and crayon work. Wooden marbles ought to be used only with pumice powder, and glass ones with silex.

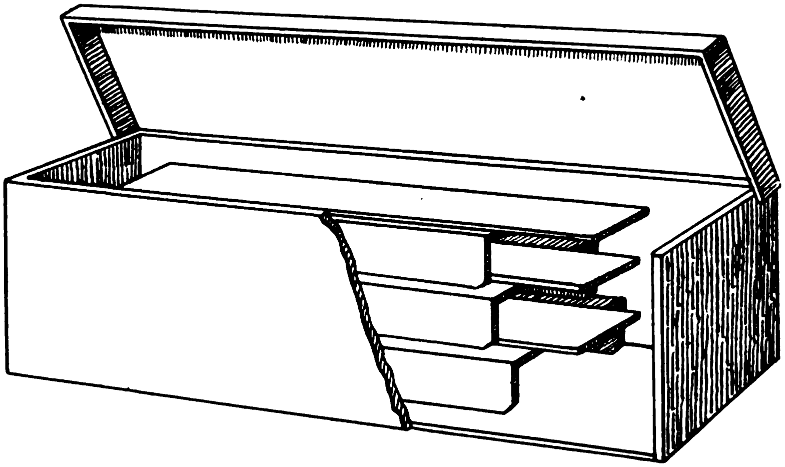
The Benedict Scale Again.

With a persistence worthy of the excellent cause, Mr. George H. Benedict keeps the "scale" to the front, and has recently issued, at the nominal cost of twenty-five cents a copy, a large sized blue-print chart, of which a very small reproduction is given below. The original is 28 by 18 inches in size, and it shows graphically the parallelism between the curves of "shop" cost, total cost, and "scale" selling price of all sizes of blocks. The facts that the figures are based on the actual experience of half a dozen representative firms over a twelvemonths trading, and that they were taken out by a good firm of actuaries, should lead to far more attention being given to them than they have yet received at the hands of the trade.



Toward Amalgamation.—One of the results of "Association" in New York is that many firms are friendly, and some are financially attached to each other—even in cases where no amalgamation or transfer is announced. When "interests" are for sale, it is advantageous to dispose of them to men already in the craft, as, recently, when Mr. Hespe sold his holding in the Central Bureau of Engraving to Messrs. Walker & Epsteam, of the Walker Engraving Co. The other principals of the Central remain—F. J. M. Gerland as President, and F. J. Bricker as Secretary.

Packing Blocks for Delivery.—A method adopted by certain American block-makers has several advantages over the method of packing in white paper for each block, with other packing in stouter paper. For each block a sort of unfinished box-lid of cardboard is made. By a simply arranged hand-guillotine, a piece of cardboard (on which the block itself is set as a gauge or measure) is cut to two depths longer and two depths wider than the block. This card is then fed four times (once for each corner) into a corner-cutting guillotine set to cut out a square equal to one depth of the block each way. The card is then scored and bent, and forms an excellent protection. A coarse, heavy straw-board is used, with a face of fine paper. The cost is very little, the blocks are well protected, and there is a sense of finish about the method. Moreover, the same packing is useful to any customer who uses but few blocks and has not much storage-room, and saves him trouble when sending blocks to the printer.



A convenient calcium drying-box.

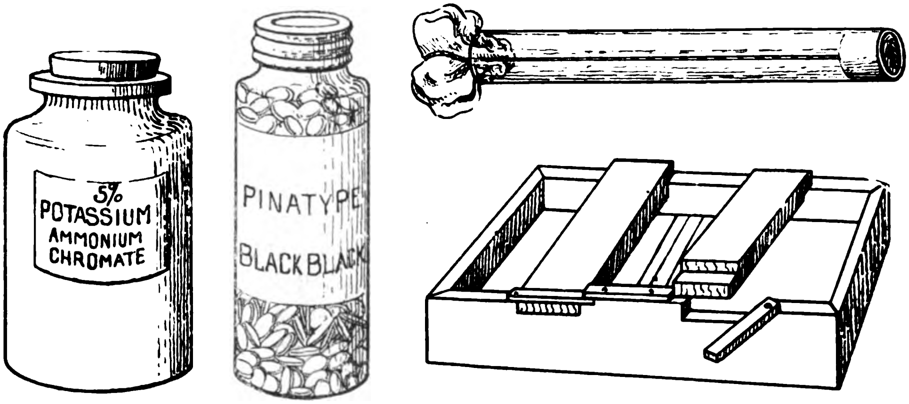
Negatives from Negatives without a Dark Room.

A new way to make reverse negatives from a negative. Useful for collotype and other processes.

TAKE two or three ordinary dry plates (unused), or as many as duplicate negatives required, and in subdued light immerse in pure hypo (no acid or alum). This will fix out the silver and leave clear glass plates coated with emulsion gelatine. These should be thoroughly washed; then proceed to re-sensitise with a 5 per cent. solution of potassium ammonium chromate; dissolve two "tabloids" (B. W. & Co's.) in 1½ ounce warm water; then add slowly, with vigorous shaking, ½ ounce absolute alcohol. This is a rapid sensitiser for paper films or plates. Apply this with a mop of cotton-wool, partly drawn in the end of a glass tube with a piece of string, to form a handle. Each plate, swabbed over with sensitiser for three or four minutes, is placed in a calcium drying box to dry; such a box should be of metal (tin), somewhat larger than the plate, a few inches deep, and with three loose trays about half an inch apart. At the bottom of the box a small quantity of calcium chloride in an envelope is placed; the trays are for the plates, one over the other, the whole covered with a metal lid. A few boxes of this kind for different sizes of plates are handy to have. Plates can be dried in about one or two hours.

The copying is effected in a printing frame, the dry plate and negative face to face, and exposed for twelve to fifteen minutes to bright daylight. When a number are required to keep them of equal density, some sort of an actinometer should be used.

The exposed plate is washed in running water till no trace of the yellow chromate shows in the drip water. They can now be immersed in a bath of Black brown "Pinatype" aniline dye (31 grains or 5 tablets to 3½ ounces water), sold in tablet



Chemicals, swab brush, and pressure frame.

form in a glass bottle by Messrs. Fuerst Bros., 17 Philpot Lane, E.C.

The peculiarity of this patent dye is its selective quality of staining only the *unexposed parts* of the gelatine protected by the negative in copying—hence another negative from a negative.

After a thorough good washing the plate is passed through a weak solution of potassium metabisulphite and then again washed for a few minutes. This clears away any yellow tinge that may remain in the hardened parts of the gelatine.

The utility of this process is its economical value, enabling the hand-press collotype printer to duplicate or repeat quickly and cheaply any number of negatives on one sheet, thus reducing the number of pulls or impressions.

The Process Man; and "His Little Ways."

Disconnected Extracts from a lecture at the Bolt Court School by Mr. Robert Vincent.

(Concluded from p. 85.)

7. The Fine-etcher's Sufferings and his Stubborn Heart.

The operator has an easier time of it at the governor's hands than the fine-etcher, because it is the proof that is criticised, and the manager should always bear in mind that if the job is begun badly the end cannot be satisfactory. We are, I know, prone to jump at the man close at hand, and so the etcher often takes more blame than he deserves. So it behoves the operator to be kind to his persecuted brother, who stands between him and the rod.

But the fine-etcher who knows what is due "on principle," as he calls it, is a terribly difficult chap to get on with. He coolly says there are so many hours in this job, and lays himself out to put that time on it "on principle." Surely "the man who pays the piper should call the tune," and I cannot get to the bottom of their reasoning, for if told by an intelligent foreman that half an hour is all that can be allowed on such a job, surely if that time is honestly spent on it, and the firm wants nothing better, it is their business and not the man's. Also it must be understood by the fine-etcher that in a first-class atelier the careful plodding style of stopping-out and still-etching and the bustling hog-hair-scrub work must run side by side, and it is disheartening to find otherwise sensible men getting hold of a plate and laboriously stopping out outlines and detail for an hour, and giving the plate a smell of the iron, then another stopping-out for hours at a stretch, with a final dead flat result that will hardly stand any ink on, when a judicious straight down bath and a scumble here and there would, as the experienced manager well knows, yield just as good a proof, and an infinitely better printing block.

Such are they who call men who honestly treat a job according to its requirements, rushers, and those so maligned should have a ready answer, when they see one of the work-dodgers crooning over a plate, with the remark:—"How many inches in your plate, eh?" "14 inches, see, at 6d.=7s.; not much for the governor; it has cost him 3s. 6d. to get it fine-etched." Fortunately this sort of shirking is becoming a thing of the past, the process worker himself being foremost in putting it down, but it has been very trying to the manager, and without wishing to hurt anyone's feelings I could not refrain from just mentioning quietly among ourselves that such a character, let us say, *did once* exist in our workshops.

8. SEEKING A JOB.

Just a word, gentlemen, on the way in which we approach a firm when we are seeking an engagement. There is much character revealed in such applications. I wish I had preserved for you a few I have had sent me during my business life.

A plain statement of what daily work you have been mainly engaged in, where, and at what salary, is really the most convincing, being straight to the point, and leaving no doubt in the mind of the prospective employer as to whom he is dealing with, and his wage, the two essential things. I find that the rule among process men is to catalogue a great variety of attainments, so that it is difficult to gather exactly what the man can really do, and also to leave the wages question out altogether, which is manifestly absurd. I remember, though, once a letter being sent from a gentleman in which every known relief block process and branch was mentioned, and it wound up by saying "My wages would be 35s. per week." As I could only own to a superficial knowledge of some of the processes mentioned, you can imagine the utter futility of a man, however hard pressed for work, and however clever he may be, putting down such a category of attainments, and winding up with such a low salary desired. It precluded further investigation at once.

The Photographic Annual, 1909, is in active preparation, and while it will repeat the most important photo-mechanical "facts and formulæ" from 1908, many will have to be deleted to make room for more recent information. The 1908 volume contained more practical factual matter for process men than any other single book in publication, but we want our readers to look through the volume and point out *at once* any omissions or mis-information. To any reader who sends a paragraph that the editor can use we will gladly send a complimentary copy of *The Photographic Annual, 1909*. If two readers send the same matter, the copy will go to the one whose letter is first received. Address all communications "*The Photographic Annual*," 6 Farringdon Avenue, London, E.C.

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Three-color Printing.

An abstract of a lecture at Bolt Court School by Mr. J. R. Riddell.

(Concluded from page 83.)

THREE-COLOR PRINTING INKS.

INKS for three-color printing must give in practice the nearest results to the three primary colors. Bear in mind that certain shades of brilliant green, violet, and brown cannot be reproduced by superposing these colors. Is it not possible to standardise these colors? Cannot the color photo-engravers get together, and with their scientific knowledge decide the color which the printer should use? Then let them make their plates so that one maker's plate will work alongside another.

There has been a little controversy lately about the colors that the printing ink manufacturers supply. Is the ink manufacturer at fault? I think not. We know that there should only be one yellow, one red, and one blue, then why does not the engraver get his filter and dyes standardised if this is what determines the colors he pulls his proofs in? To my mind the fault lies here; for they send out color-sheets pulled in colors that will enable them to get their proof passed. The color-printer hands these sheets to his ink maker; thus the supply of hundred and one shades for three-color printing. Perhaps standards will come some day, justas was found necessary with the screws used in machine building by Whitworth.

Some printers pride themselves on their special inks for three-color printing, but it sometimes happens that they are cherishing something left off by others long ago.

TREATMENT OF THE INKS.

The successful color printer is one who knows how to use the materials at his command. There is plenty of scope for him to show his artistic tendencies without tinkering with the inks supplied by a reputable house, or perhaps making them up from any colors he may have by him, and losing transparency, brilliancy, and working qualities.

The purchase of good inks does not make a good printer, but he will use them with understanding, so that the different printings will lift on the preceding colors. His ink must be prepared so that there will be no "glossy" or "crystallising" effect, to prevent the proper superposing of the colors following. *This is of vital importance.* It is here that the variation of color effect oftenest comes in and must be guarded against.

Sometimes, even with all care, the colors will get dry and not "lift" properly. There are many "fakes" to overcome this, such as solid paraffin mixed with the ink, but there is none, I know of which acts so well as rubbing the sheets with magnesia. This is not a thing we like to do, but it sometimes helps one out of a troublesome difficulty.

When printing the last color it should be worked "hard," and sometimes a little drying varnish is helpful.

PRINTERS.

What can we say about the individual called the printer? I know that it is most difficult to get a good color printer, and that the demand far exceeds the supply. My own experience has been that I must train my own color printers, and that the younger I can catch them the better it is. My experience is that a small percentage of printers make good color process pressmen, and a first-class color printer is not necessarily good at other classes of work.

Let me again make a plea for a closer touch between the engraver and printer. Let the printer know how to remedy small technical defects in the plates, and let the engraver learn something about the printing of his plates under modern commercial conditions. There would be less hard things said about the plate maker, for he would see that the printer would get nothing but printable plates.

PRINTING MACHINES.

I have not yet seen a perfect machine. Most machines have good points. In considering a platen machine for color work, on which there is a good deal of three-color work printed at the present time, I think there is only one type to be considered, that is, the heavy platen, with rolling platen and slide up to the forme movement, and with cylindrical inking. These class of machines are well known —Colts, Armoury, Caxton, Phœnix, etc. These machines will do all that could be expected from them, but their fault is weakness in rolling and impression, so that for heavier and larger work we must look to the cylinder machine, with its increased difficulties in producing accurate color work in large sheets.

I think I am correct in saying that most of the best color work of to-day is being done on the two-revolution machine of reputed American invention. Undoubtedly it is one of the best for a general class of work, running at a fairly high speed; but on the highest grade of color work, and that of a heavy nature, high speed is somewhat of a white elephant. This machine is weak under pressure on heavy work, also the rolling is not so good as it might be. I do not wish to prophesy, but I believe that as we get on to finer work and larger sheets, we shall come back to the stop cylinder machine. Perhaps not just like our Wharfedale, but a machine that is as rigid under pressure as that well known style.

MAKE-READY.

It is assumed that the cylinder is firmly on the bearers with equal and regular pressure, and that the machine has been tested for register. We now pack the cylinders with hard packing, completed with super-calendered paper, taking care that no more sheets are carried than will bring the packing level with the cylinder flanges.

We are now ready for underlaying, bringing the surface of the plate to type height in an even, regular way, so that the plate will receive the proper inking, and present a firm and unyielding surface to the pressure.

This requires far more attention than is generally allotted to it. In fact, I believe it is of more value than overlaying.

BLOCK MOUNTS.

Along with underlaying we must consider mounts. The ideal mount would be a metal base, that would adapt itself to all and every condition a printer has to contend with, but as yet we must fight away with wood, which, under the best circumstances, is unsatisfactory. Why is it that photo-engravers will not give a little attention to mounting their plates? They prove on metal bases, and send the plate out mounted on wood. Is it that after the proof is passed they lose all interest in the job? May I give them another hint? They ought to make their mounts up to even picas. It would be a boon to the compositor when making up.

OUR FIRST CARE IN UNDERLAYING

is to see that the mounts lie perfectly flat, with not the slightest rocking motion. If there is a warp in the mount, take it off, and plane it until it lies perfectly level. Then when underlaying, take care that no rock is introduced, and that the plate is not brought above type height. Also see that no block in a forme is higher than another, or this will cause difficulty in getting register.

OVERLAYING

is the operation of suiting the pressure to the different tones in the plate, so that they will transfer evenly and sharply to the sheet when printing. This is usually done by cutting out a series of sheets and pasting them together, then fixing them on the cylinder so that it will come in exact relation to the plate when printing. For color work I am not a believer in the ordinary cut-out three-ply overlay. It is a source of trouble in altering the color tones in the finished job. Should an overlay be necessary, let me recommend the chalk relief overlay. It comes nearer to anything I know of in giving the best results. My reason for not advocating the ordinary cut-out overlay is this. The etcher in making the plate has spent a great amount of time in obtaining the correct color values. Why should we printers undo and perhaps spoil the results with our overlays? Given good paper, good plates, and good ink, a printer will get good results even on long runs without showing his skill as a picture maker, but every care should be given to underlaying.

REGISTER ON THE MACHINE.

It is not often that a modern machine will not register. It is advisable before running on with a color job to run about a dozen sheets of paper through the machine at the speed at which the job will be run. Put these sheets through two or three times, to show if the machine is registering properly. Keep the sheets, and run one through occasionally to see if the register is still correct.

If they do not register, watch how the machine is being fed. The sheets may be bulging against the guides, or the feed guides resting too heavily on the tongues. The guides should be supported by the pin or stop on the feed-guide brackets. Examine the face of guides and tongues and see if there be any grit, paper, or a burr which will prevent the sheet from registering. See if feed guides rise too quickly, or remain down too long. See that the grippers are properly set, with an even pressure right along the sheet. Also see if the gripper, cam, or tumbler is close to the stop. The tumbler should always be set with a sheet of paper between it and the stop when printing. Another cause for bad register is imperfect setting of the register rack. Slightly ease the bolts on the rack, and turn machine slowly, then allow to run. This will let the two segments run into each other. Then tighten up bolts on register rack. Note if air-cushion and bufferareworking correctly. A great deal depends on the setting of these, so that the bed may have a gentle reverse. The chief cause of bad register on a two-revolution machine is usually the intermediate gear. This gear must be set to a nicety. When the cylinder is on the impression, the intermediate gear should just fit nicely into the cylinder gear and driving gear. Note that the feed tongues on the feed board are properly set, so that the paper does not bulge over the tongues.

Set the tongues and feed guides three or four inches from each end of the sheet, and have a gripper outside the tongues, and within an inch of the end. See that the drop fingers are acting properly.

Next set the sheet bands. These are for keeping the sheet close and snug to the cylinder. If not practicable to use these, fix a tape to run in margin so that it will hold the sheet firm to the cylinder. This is essential for good register. Take care in setting that the sheet bands do not come in touch with the grippers or shoo fly. A most annoying cause of bad register is imperfect feeding of the sheets, a fault which cannot well be detected in the first printing. It is, therefore, necessary for the printer to be "alive," as he must be held responsible for the work turned out on his machine. It is a good plan in feeding close register work that the feeder brings the sheet down to the two front guides, then pulls it gently into the side lay, passing his hand over the sheet to ensure that the sheet is in all the guides, taking care not to bulge the sheets against any of the lays. See that feeder does not lean heavily against the side of the feed board. It may give, and then there is trouble in store. Do not allow the paper to be thumped down on the feed board. This may alter delicate adjustment of the lays, and when feeding in sheets, see that each sheet lies perfectly level and flat on board, not allowing a few sheets to be below the sheet that is ready to go round the cylinder. Note if the paper runs against the side lay as it passes from the feed board. This is a fruitful cause of bad register. The guides ought always to be set so that the paper will run away a little from the side guide.

Imperfect Register in Three-color Work.

With the spread of three-color work one hears increasing complaints of want of register. Generally the first thing to be blamed is the lens, and yet, although the writer has tested a large number of lenses for their performance in this respect, he has only once found one at fault, and this was abroad, with a very expensive type of lens and one that is not often met with in England. A very simple test for the suitability of a lens for three-color work (in effect exactly the same one as that devised by Sir Isaac Newton to test achromatism) consists in covering three strips of color-filter gelatine, red, green, and blue, placed close together, with a hair or very fine wire. This is now photographed either as a transparency or laid on a sheet of white paper, with the hair behind the filter strips. Then if the lens is a suitable one there will be no displacement of the line, and it will be equally wide; if not, it will either be displaced across one of the strips or altered in size.

The next source of trouble is the filters, and they are certainly more often in fault than the lens. A simple way to test them is to photograph something having fine lines, such as a scale or any subject having register marks, through the three filters, and after the negatives are made make three contact transparencies from them, taking care there is good contact when exposing. Now each of the transparencies can be placed in contact with the negative from which it was not made: thus the red transparency will be placed in contact with the blue and green negatives. If there is the slightest failure in register it will be instantly detected, and if there is none, then the filters are not to blame. Supposing the error lies in the filters, it is often awkward to get them replaced so soon as one would like; in this case one should use a liquid filter in a cell and use the same cell for all three negatives.

Another cause of want of register which may be unsuspected is in the case where two screens are used, one the 45 deg. ruling, and the other the 15 by 75 deg., and they are not both the same thickness. The consequence is that the images will not be the same size at the focal plane, owing to the differing amount of refraction. This is often noticed when using a metzograph screen for one of the colors, as these screens are nearly always much thinner than the cross-line screens.

If the copy has been put up damp, sometimes it may change in size during the exposure from the heat of the lamps. The remedy for this is obvious. It is possible also that if the camera, stand, and copyboard are made of wood, and the temperature of the studio is not kept equable, that these may alter in size and so occasion want of register. Another cause may reside in using more than one dark slide and the slides not registering with each other. It is also not impossible that the operator, when placing the plate in the slide, does not in all three exposures push the plate quite home to the face plates, or he may not push the dark slide quite home; it takes a very small alteration in size to show a want of register.

Provided the same metal is used and good contact is made when printing on metal, it is difficult to see how any cause can be found in the etching on the metal; but when we come to the printing-room, of course, the sources of want of register in the sense that the three colors do not truly lie one on top of the other are too numerous to detail; but there is only one cause of want of register of the kind under discussion—viz. the differing size of the component prints, and that is due to the stretching of the paper, owing to varying conditions of moisture and temperature of the printing-room while the job is being printed. This can be prevented by always keeping the room at an even temperature day and night, and carefully covering up the paper, top and sides as well, after the printing of the first and second colors.—A. J. N. in *The British Journal of Photography*.

New Color Charts.

COLOR-CHARTS are being pushed vigorosly by certain American ink-makers, and should tend to the increased use of multi-color blocks. Amongst the latest forms is the Chromatoscope, issued by Philip Ruxton Inc, of New York and Chicago, in connection with their Margo printing inks. The Company not only supplies the chart, but offers to send samples of suitable inks for proofing any job to any printer who forwards black proofs of his blocks with sample of paper on which they are to be worked. The Crosby Color Chart, published at $3·50 (14s. 7d.) by the Tileson & Livermore Co., Pearl Street, Boston, Mass., has fifty colors, arranged radially from a centre, with masks showing two, three, four, and five openings. The whole is arranged so that wherever the masks are placed the colors shown in their openings will form a harmonious set. In arranging the colors, the designer of the chart, Mr. G. Fred. Crosby, selected a spectrum red, yellow, green, blue and violet, from which he made secondaries—orange, yellow-green, blue-green, blue-violet, and red-violet. Each of these ten is then mixed with two intensities of white, to make tints, and two intensities of black, to make shades. There are figures to show, for each combination, what proportion of space should be occupied by each of the colors, to give balance and harmony; all of which is helpful toward the fuller use of color-work.

Machine Etching.

No. XIV. Piolunkowski's Patent.

Previous articles and notes.—1907: I. Jan., Dr. Albert's Method;* II. Feb., Concewitz's Method;* III. March, Levy's Method,* and notes; IV. May, the Holmström Method;* V. June, Swain's Views on the Levy Method; VI. Sept., W. G. Thorpe's Method;* VII. Oct., The Mark Smith Method;* VIII. Nov., More about the Mark Smith Method;* IX. Dec., More about the Dr. Albert Method, and notes. 1908: X. Feb., More about the Mark Smith and the Dr. Albert Method;* XI. June, The Method of Guilio Danesi:* XII. July, The Boyce Machine:* XIII. Dec., Dr. Albert's Patent.

* Indicates illustrations.

Yet another machine-etching method has been proposed (and patented), this time by M. Piolunkowski. The method, in several variant modifications, is illustrated by the diagrams, which seem sufficiently self-explanatory. The claims for this method are that it provides for ample oxidation (or aerification) of the etching fluid, that the distribution of fluid and of pressure is well equalised over the whole surface of the plate to be etched, and that the pressure of air and of etch can be modified separately with a view to varying the results.

A Heretic.

One of the members of the New York Society of Photo-Engravers contends, and supports his contention with figures, that the modern etching-machines are not the best and most economical arrangements for the quick-etching of a great number of plates. He says that the only *real* advantage they offer is time for the etcher to sit around reading a newspaper. His own method is to have a great trough, with a series of rows of mechanically-driven off brushes, gently moving over the faces of the plates to be etched, with a man who is always busily attending to them, taking out those that are finished and inserting others. He claims that by this method, in a big shop or a little one, he will undertake to produce in as great quantities per day, with equal quality in every way, with as low cost, in time, labor, acid, and all other working expenses, and with a great saving on capital cost. We heard him demonstrating these ideas to Mr. Max Levy, whom he challenged to a contest. Mr. Levy smiled very complacently, and remarked that the contest was going on in many a photo-engraving house, and that he had no fears for the future of the Levy etching machine.

FIG. 1

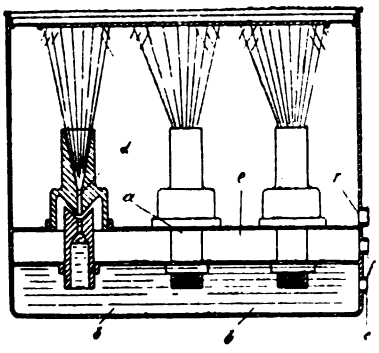


FIG. 2

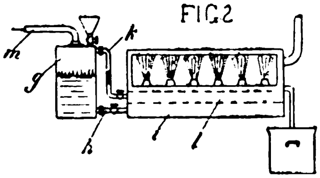


FIG. 3

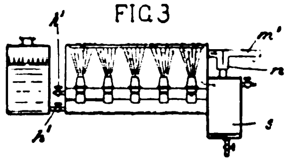


FIG. 4

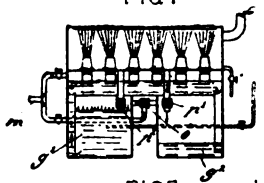


FIG. 5

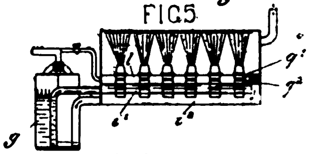
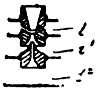


FIG. 6



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Direct Photolithography in Half-tone and Tricolor.

By R. B. Fishenden.

PHOTOLITHOGRAPHY by the well known transfer method has never proved entirely satisfactory for half-tone work, because of the flattening and thickening inherent in the lithographic transferring. Except in the most skilful hands the results are very poor indeed. The reason for the flattening in the results is not far to seek. The contrast of a proof from a half-tone block depends on the relative area of white to black in every individual unit comprising the surface, and if the proportion of black is increased in any way, this contrast will be lost; therefore the effect of the thickening will be more apparent when a comparatively fine screen is used, because, assuming an equal amount of thickening in the fine screen to that which would occur in the case of the coarse one, the relative increase of the proportion of black in each unit of white and black will be greater in the former case. For this reason, apart from the difficulty of printing fine screens lithographically, coarse screens only have been practicable for transfer photolithography.

The adoption of direct photolithography overcomes this difficulty, but direct work on stone, whilst it is eminently satisfactory for small subjects, becomes very difficult when large surfaces have to be dealt with. The adoption of metal printing plates—zinc and aluminium—has been somewhat tardy, but now that the handling of the plates is becoming more understood, there is a more extended area of usefulness for direct half-tone photolithography.

It is perhaps useful to draw attention to the fact that there are economic conditions which dictate as to whether typographic or lithographic printing shall be used for a particular piece of work. Take, for instance, the case of a line diagram; if a large edition is required the usual course is to prepare a line block and print it on a typographic machine, the printing being rapid and requiring little attention. If, however, only a small edition is necessary, resort is made to photolithography because the production of the printing surface is comparatively inexpensive and the relatively greater cost of the lithographic printing is of small consideration for the small number of prints required. The same remarks apply to very small editions of half-tone subjects.

I have used with some success both 133- and 150-line screens when printing on litho stones and metal plates, and whilst the finer screen requires considerable care in printing, there is no difficulty with the coarser one, and there is the advantage that a non-surface paper may be used with satisfactory results, which cannot be done without considerable care being exercised in typographic printing. The work is of the utmost simplicity to the photo-engraver, although over-elaborate instructions have been given from time to time.

The making of the print on the metal is carried out in the manner of the ordinary bichromated albumen process, the only difference being in the preparation of the metal. For the purpose, one of the prepared metal plates on the market may be used. These are thin sheets of zinc or aluminium, having prepared surfaces that are suitable for lithographic printing. Or we may use thin zinc which has been grained in a machine consisting of a shaking contrivance which is caused to act on a table made like a shallow dish, and filled with a small quantity of water, a layer of marbles or glass balls, and a small amount of fine sand or pumice powder. This machine imparts to the metal plate an extremely fine and even grain. As a substitute for the machine, a thick felt pad may be charged with water and pumice powder, and the surface of the plate gone over with an even circular movement; the results are not as good by the latter method, because the grain is not so deep and sharp cut and consequently the plate does not hold water so well when being printed. After being so prepared, the zinc plate requires "graining" in the ordinary nitric and alum bath, which causes the surface to become extremely sensitive as regards the greasy lithographic image, depositing on the zinc a thin film of alumina.

The print is made in the ordinary way, and any reader who may be unacquainted with the procedure to be adopted in bichromated albumen is referred to any standard article on the subject.

The character of the negative to be used, however, requires consideration. It should be very strongly "joined up"—in fact, it should represent the full range of an etched half-tone block. The shadow dots should be rather large, because a very fine dot is liable to be lost in the making of the print. After development, the plate is wiped over with a thin layer of gum arabic and allowed to dry. Next, the gum is removed with a damping cloth so that only a minute trace remains, and this is again allowed to dry. The plate now requires treating with a "washing out" preparation, such solution being prepared according to the following formula:—

Yellow wax - -	2 parts.
Stearine - - -	2 ,,
Terebine - -	2 ,,
Asphalt - - -	4 ,,
Re-transfer ink -	1 part.
Turpentine - -	60 parts.

There are now on the market a number of such preparations, any of which may be substituted. The purpose of the preparation is to replace the thin film of re-transfer ink by something more rich in fatty matter, and the use of it constitutes one of the principal factors in the successful use of metal plates in lithographic printing.

The print being covered by a minute trace of the solution of gum, the gum is repelled by the ink image, whilst it protects the bare metal. The washing-out preparation is now applied with a soft cloth, and rubbed into the plate, thus replacing the re-transfer ink. The plate is again allowed to dry with the film of the preparation entirely covering the plate, and on being again wetted the soluble gum coating will be removed and take with it the preparation from all the portions of the plate which were originally clean. In this condition the work presents no difficulty to the lithographic printer.

As regards the use of the tri-color process there are considerable possibilities. Until recently such a course would have been impracticable, because the photographic portion of the work has been more or less imperfect, and as a result there has been necessary a large amount of hand correction—in other words, the plates have required considerable fine-etching. With a more perfect understanding of the correct working conditions, a great advance in the color-sensitiveness of the plates and the more nearly correct filters, the photographic portion of the work has approached that aim of the investigator—an automatic process. If a large amount of hand correction has to be done on the plates, the method is not suitable for application to photolithography, because it does not lend itself readily to any alteration of the resulting plates, but a series of trials which have recently been carried out show that very pleasing results may be obtained by direct photolithography in tricolor, using a screen of 133 lines to the inch. The results have not been by any means facsimiles of the originals, but they have been free from the crudity which is sometimes seen in tricolor relief blocks. There is a certain class of commercial work which could be carried out satisfactorily in this way, especially if a careful fourth printing were added. The coarseness of the grain is not as easily detected as with relief blocks, and the possibility of using non-surface papers is a great advantage.

It should be remembered that the lithographic tri-color inks for such work must be of a similar absorption to the set which would be used with typographic blocks, providing the same light-filters are used in the making of the negatives.

Brevities.

GOOD BLOCKS AND BAD, and how to tell one from the other, formed the subject of a lecture to printers, in Glasgow, by Mr H. E. Atkins, managing director of the Dux Engraving Co.

A CURIOUS PROCESS BUSINESS is that of the Strate Process Co., which quotes especially low rates *but*—(1) accepts no "rush" order; (2) works only for cash with order; and (3) has no messengers, freight charges, or canvassers, as customers must deliver their originals and fetch their blocks. The system is said to be a great and an increasing success.

MACHINE-PRINTED PHOTOGRAVURE as produced by the Van Dyck Photogravure Co., New York, and mentioned in a recent issue of the *P.E.M.*, is exemplified by a supplement illustration to the current (Feb.-March) number of *The British Printer*.

S. E. SHEPPARD, D.Sc., F.I.C., is lecturing at Bolt Court on Thursday evenings until (and including) June 24th, on "The Theory of Photographic Processes," as the result of investigations by Dr. Mees and himself. Free to students of Bolt Court; 2s. the course to others. The school is to be congratulated on providing the chance to hear the greatest living authority on a particularly interesting and important subject.

A MAMMOTH POSTER.—Process men and members of the printing trade generally who visit Great Yarmouth during the coming season will see a large poster (9 sheet, 40 x 30), depicting the Yarmouth Hippodrome. They will be interested to know that it is produced by three-color-photo lithography and is probably a record in size for a poster so produced. The firm responsible for this mammoth three color poster is Messrs. Jarrolds & Sons, Ltd., of Norwich and London.

A GROSS PROFIT of £29,650 in 1908 as compared with £29,556 in 1907 is not regarded as satisfactory by the Hentschel directors, for competition, price-cutting, and the general trade depression have somewhat reduced the turnover, and slightly decreased the net profit. As they do not feel any certainty of immediate improvement in conditions, they wisely and conservatively recommended the reduction of dividend on the ordinary shares to 4 per cent. (6 per cent. is paid on the preference), and the carrying forward of nearly twice the balance brought into account at the beginning of the financial year just closed.

A PRICE-CUTTING METHOD is indicated by the letter quoted at foot, which appears to have been distributed pretty nearly broadcast to the American magazines that use illustrations. The method has been used before by many classes of advertisers, from makers of soaps and patent foods to builders of boats, bicycles and bassinettes. There are many cases when mutual dealing is advantageous. If A, who is a newspaper man, needs half a dozen bicycles for his family, and B, who is a bicycle-maker, needs advertisement, there may be reason in B using the journal of A rather than that of C, and in A buying the bicycle of B rather than that built by D. But it has been the experience of publishers of periodicals, and also of the various manufacturers, we believe, that any general business on the "swapping" lines is unsatisfactory. Publishers think that the manufacturers sending out these circular-letter offers are generally second-class, imperfectly organised concerns, with weak advertising-management, and likely to be producers of inefficient goods. They are quite sure that many of the journals which jump readily at such offers are those of small circulation and of relatively little importance, whose space is worth little. Good advertisement space is worth its price, and the best magazines are not open to "trade" offers. Good goods are worth their price, and make their way in the open market, so that we do not think the barter scheme a good one when it goes beyond the bargain that is negotiated individually and becomes a circular-letter offer. The fact that half-tones may be a more legitimate subject of barter with a journal than, say, bicycles or sewing-machines, does not alter our general opinion that the block-maker sending out such a letter as follows is sure to get poor bargains; to pay top prices for unselected advertising that is in some cases of very little value to him; to miss the best magazines altogether; and, if they notice his appeal at all, to prejudice against him the very buyers that he wishes to attract most strongly:—

"GENTLEMEN,—We want to double our business this year, and are making a few of the leading publications a special offer.

"On all orders for half-tones sent us during 1909 we will take out one half the amount in advertising. We will furnish you the best grade of fine line copper square finish half-tones from photographs you furnish at the rate of 12½ cents per square inch, with a minimum charge of $1.25 for any cut under 10 square inches. Medium line on zinc 10 cents per square inch, with a minimum charge of $1.00 for any cut under 10 square inches.

"If you wish to accept this offer, reply within one week; we cannot keep the offer open longer. Send us your rate card with best discounts, and a sample copy of your publication.

"You will be able to obtain your illustrations at a very low price, and enable us to try your publication and see if we can use it as a constant medium for us to advertise with you.—Respectfully yours, ——."

Correspondence.

THE FUTURE OF PHOTOLITHOGRAPHY.

To the Editor, "The Process Engraver's Monthly."

DEAR SIR,—In your closing remarks to the extract from *The National Lithographer re* the future of photolithography in April issue of *Process Engraver's Monthly*, you express the belief that lithography in Britain has not such a gloomy outlook as in America. Yet from what one hears from several quarters three-color letterpress is doing such a lot of work that used to be done litho that many firms have a large proportion of their litho machines standing idle. In face of this fact it behoves lithographers to welcome any method that will reduce the number of his printings and so win back some of his lost ground. It must be admitted, even by lithographers, that lithographic methods are antiquated, and taken as a whole the craft stands almost as Senefelder left it, with the exception of Day's mediums, the only modern method of reducing the number of printings and the cost of production.

But apart from this, although lithographers have seen and noted the advance in three-color block printing, they do not seem to have learnt anything from it, nor bestirred themselves in any way to keep color work from drifting away into the letterpress department. This seems a great pity, because it seems to me that unless lithographers look things fairly and squarely in the face, their business will dwindle down to almost nothing, and all color and some black printing will be done by photo process and printed letterpress.

So that it seems, as you remark, that if lithography is to get back to the front, all progress will come largely from the process photography side. But it is common knowledge that several important firms in Britain have from time to time spent thousands of pounds experimentally in trying to apply photography to lithography. Add to this the fact that the patent records show that all over the world the busy inventor is applying himself to the problems of photo-chromo-lithography. We are also told that large firms on the continent are using photography extensively in order to simplify and cut down the number of printings.

All this goes to prove that busy minds are at work, and it behoves lithographers to drop their conservatism and wed photography to existing litho methods and restore lithography to its old position.—Yours faithfully, PHOTOLITHO.

Estab. Jan. 1894.
"The Process
Photogram"

THE PROCESS
ENGRAVER'S
MONTHLY
THE PROCESS PHOTOGRAM
ESTABLISHED JAN 1894

VOL. XVI. No. 186.
JUNE 1909.

Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly.*

On "Flashing" the Half-tone Negative.

Translated from *Le Procédé*.

We know that a certain small amount of light is indispensable to obtain the first trace of a developable image on a sensitive surface. This slight quantity varies with the nature of the sensitive surface and the conditions of its preparation, but can be estimated at about 5 candle-metre-seconds for wet collodion and about 0·1 to 0·5 C.M.S. for different gelatino-bromide emulsions.

It is known, on the other hand, that we can strongly increase the apparent sensitiveness of a photographic emulsion by giving it, previous to use, a flash. The small quantity of light thus received should be less, or, at most, equal to, the least amount of light described above. Under these conditions the plate, while not being actually fogged on normal development, or showing only a fog of unimportant intensity, will yield an image, however weak may be the quantity of light received in the proper exposure. The inertia of the sensitive surface is overcome in advance, and the surface brought to a state of uneven equilibrium which can be broken down by a quantity of luminous energy too feeble to have any useful effect without the preliminary "flash."

When reproducing from originals with strong contrasts, the proper exposure is preceded or followed by an auxiliary exposure, for which the screen is kept in its working position, the diaphragm generally somewhat smaller than for the main exposure, and the original covered with a sheet of paper or white bristol board.

We propose to make a record of the effects of this auxiliary exposure, utilising the considerations which we have previously expressed in these pages on the theory of the screen. Let us suppose first that the original has a scale of tones from pure white to pure black, and that we use a square diaphragm whose diagonals should be parallel to the lines of the screen, the ruling being done in such a way that the summits of the cones of shadow and high-light should be contained in the plane of the sensitive preparation.

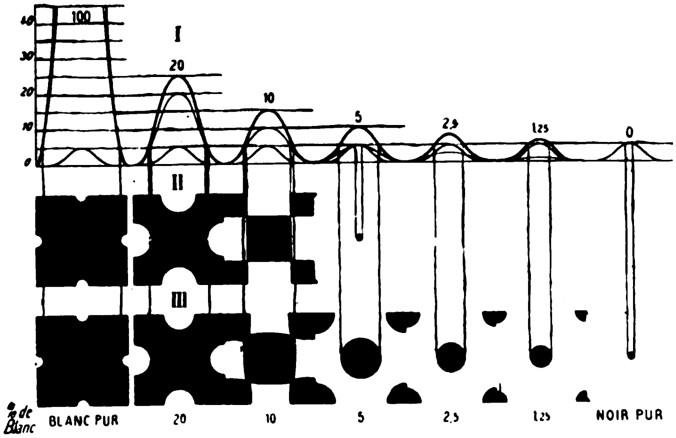
As the greatest extent of contrast which can exist under good conditions on wet collodion generally slightly exceeds 20 : 1, if we admit as the least value an illumination of 5 C.M.S. we will be obliged to arrange the length of exposure so that the quantity of light received by the plate in the central portion of the sections of the image corresponding to pure white should be about 100 C.M.S.

If under these conditions we try to estimate the amount of light received on the parts of the plate corresponding to the different tone values of the scale, constructing, for example, the curve of illumination following one diagonal of a space in the screen, we obtain the set of curves indicated by fine lines in fig. I., where each part considered is drawn by the percentage of white in the grey, this percentage constituting a measure of brilliancy in each tint of the scale, with such unity that under the actual conditions of illumination the brilliancy of the white should be represented by 100, that of pure black being understood to be zero.

The only portions of the plate capable of yielding a useful opacity on development being those where the illumination is greater than 5 C.M.S., we can see in advance what would be in each portion the shape and extent of the outline of the dot (fig. II.).

We see that tones are differentiated by the variations in the extent of the dot in the portions of the tone scale which have conveyed to the sensitive plate in the central part of each dot the amounts of light comprised between 5 and 100 C.M.S. These variations become very weak between the whites and lighter half-tones (portions omitted in the diagram for the economy of space).

If the contrasts of an original are comprised in this interval 20 : 1, that is to say, if the darkest shadows of this subject reflect towards the lens a quantity of light which should be at least the $\frac{1}{20}$th of that reflected by the lightest portions, it will be possible to reproduce on the negative screen the variations of the light and shade of the original without "flashing."



If the contrasts are greater, only a part of them can be normally differentiated on the negative. We see, especially in fig. II., that all parts of the scale of tints which have conveyed to the sensitive plate opposite the centre of each space an amount of light inferior to 5 C.M.S. have brought out no appearance of an image, and thus blend with absolute black. Now, suppose that to the proper exposure is added the effect of "flash," the length of which should be, for example, $\frac{1}{10}$th of that of the principal exposure, with a diaphragm of the same form but of half the linear dimensions, the conditions would closely resemble those usually practised.

The effect of this auxiliary exposure is carried into each dot of the screened image, and whenever the share of light (indicated on fig. I. by curves traced in lines of medium thickness) is as much during the auxiliary exposure as during the principal one, we obtain the arrangement drawn in heavy lines. The section, made like the preceding, then gives for the dots the forms and dimensions illustrated in fig. III., where are represented this time all the dark half-tones, without which there would occur no change in the rendering of white and clear half-tones.

It can easily be proved by diagrams such as the above that neither a general illumination of the plate in the absence of the screen, nor an auxiliary one given after the screen exposure but with a very small diaphragm, giving an almost uniform illumination to the central part of each dot, will procure the same advantages; on the other hand, the use for this auxiliary exposure of the same diaphragm as for the principal exposure would not limit the effect of the auxiliary exposure to only the dark parts of the image, but would also increase somewhat the dimensions of the opaque dots in the parts corresponding to the light half-tone of the original. It is not necessary to always give to the "flash" the same duration, so long as the amount of light in the centre of each dot attains every time the necessary minimum to conquer the inertia of the sensitive substance used. If, for example, the extent of contrasts of the original is as 50 : 1, the principal exposure, made as above in such a way that the whites of the original convey to the centre of each dot of the screen image an amount of light of 100 C.M.S., the deepest shadows, will convey to the centre of the corresponding dot an amount of light of 2 C.M.S., and the auxiliary exposure will only have to furnish the necessary quantity to reach the minimum, about 3 C.M.S. If the auxiliary exposure be prolonged more than is required, the result will be reduced contrasts, and all the dark half-tones which we propose to differentiate will be mixed, not, as formerly, into a pure black, but into a grey so much the lighter as the auxiliary exposure is prolonged.

Machine Etching.

No. XV. The Holt Etching Machine.

Previous articles and notes.—1907: I. Jan., Dr. Albert's Method;* II. Feb., Concewitz's Method;* III. March, Levy's Method,* and notes; IV. May, the Holmström Method;* V. June, Swain's Views on the Levy Method; VI. Sept., W. G. Thorpe's Method;* VII. Oct., The Mark Smith Method;* VIII. Nov., More about the Mark Smith Method;* IX. Dec., More about the Dr. Albert Method, and notes. 1908: X. Feb., More about the Mark Smith and the Dr. Albert Method;* XI. June, The Method of Guilio Danesi:* XII. July, The Boyce Machine:* XIII. Dec., Dr. Albert's Patent;* XIV. May, Piolunkowski's Patent.*

* Indicates illustrations.

Mr. H. W. J. Holt has not only had experience under his father, the manager of John Swain & Sons, Ltd., and been manager of the "process" section of Taylor, Garnett & Evans, but has also paid much attention to the developing and demonstrating of the Mark Smith etching machine. Therefore he starts with good knowledge of the problem when he essays to design a machine for etching. He believes that he has devised one which is new in principle, and better than those which went before. It is described in the patent as an "apparatus for etching printing plates, of the kind in which the plate is immersed in the etching liquid and the liquid is constantly moved in contact with the surface of the plate, by means of blades, or fingers, dipping into the etching liquid and projecting downwardly from a plate, or carrier, which has been horizontally reciprocated, but which it has been proposed shall have rotary or oscillatory movement, and the object of my invention is to provide a durable and efficient apparatus by which the desired effect is obtained in a very expeditious, economical, and satisfactory manner.

"Fig. 1 represents a side elevation of the machine, with the etching bath in section, and figs. 2 and 3, respectively, a transverse section and plan of the under side of the disc carrying the impelling blades, or vanes.

"The plates to be etched are supported in the etching bath D, and at a suitable distance above, dipping into the liquid, are blades, or vanes, A, carried by a horizontal disc B, secured to a vertical shaft C, to which rotary motion is transmitted by any suitable gear. The gear is shown as consisting of an electric motor G, the cord *g* from which passes over a pulley *h*, on a shaft H, carrying a variable speed cone h^2, or pulleys, driving, by the cord g^2, a variable speed cone h^3, or pulleys on a shaft H^2, carrying a pulley h^4, over which passes a cord g^3, driving a pulley *e*, carried by a collar e^2, which has ends capable of turning in bearings in the projections e^3, of the framing E, the shaft C, engaging with the said collar e^2, by a groove-and-feather connection which causes the shaft C and disc B to rotate with the collar and allows the shaft C and disc B to be raised, as shown in dotted lines, and lowered, as shown in full lines. The disc B is supported at the requisite elevation above the plate *d* in the bath D by the head c^2 on the shaft C, the said head resting on the upper projection c^3 and having in it a groove in which engages a roller on a bent lever c^3 centered at c^4 to a bracket c^5 and provided with a handle for manipulating it. A spring-actuated pin *i* enters a recess i^2 in the shaft C to hold the disc B in its raised position out of the bath D. The blades A extend from, or near to, the outer circumference of the said disc B, to a suitable distance from the centre, and are so shaped and disposed, as seen in fig. 3, that when the disc B is rotated, each of the blades forces the etching liquid towards the centre of the device and expels it at the centre in streams in opposition to each other, so as to effect very efficient movement and circulation of the liquid and very even etching. The blades may be fixed to the disc B in any convenient way. As shown they are formed with projecting parts entering recesses a^3 in the disc B, and pins *a* pass through them and the disc B, and are secured by cotter-pins a^2.

"To further circulate the liquid, I may provide the disc with auxiliary blades F, or short vanes, arranged at such an angle (as seen in fig. 3) that the liquid impelled towards the said auxiliary blades is deflected thereby, so as to effect still further circulation of the liquid.

"The blades may be of any suitable shape, but the blades A are preferably curved somewhat like the vanes of a fan and they may be made of plough, or somewhat scoop-like, formation so as to lift the liquid. The blades F are preferably curved as shown, and both, or either, of the sets may be perforated, or have portions cut from them, preferably at their upper parts, as

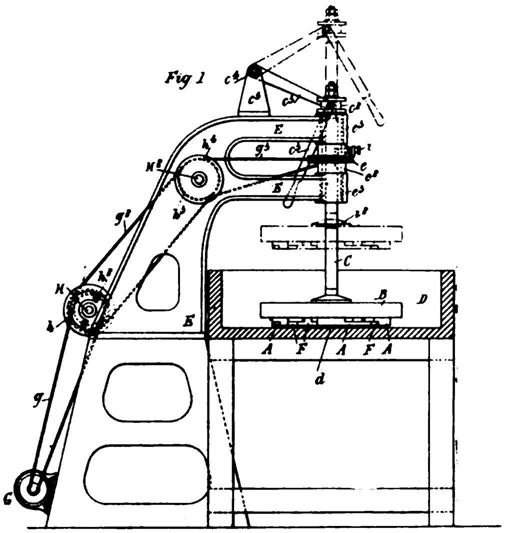


Fig 1

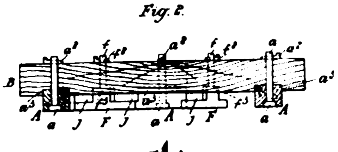
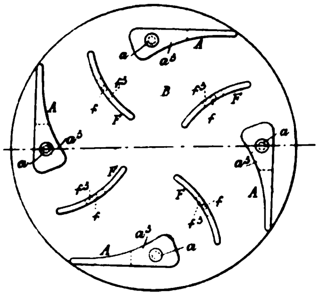
Fig. 2


Fig. 3


shown at *j*, to further facilitate the movement of the liquid.

"Of course the parts with which the etching liquid comes in contact are made of, or are protected by, material which will not be injuriously acted upon by the liquid.

"The apparatus can be run at small cost and is silent and free from vibration and is not liable to wear rapidly or to readily get out of order, and the parts can, when necessary, be readily replaced at small cost.

"Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

"1. In apparatus of the kind aforesaid for etching printing plates, impelling blades or vanes, such as A, carried by a disc, or equivalent carrier, provided with means for rotating it, the said blades or vanes being shaped or disposed so that, when the disc or equivalent carrier is rotated, the said blades or vanes act upon the etching liquid.

"2. The combination with an arrangement in accordance with the preceding clause, of auxiliary blades, or vanes, such as F.

"3. An etching machine constructed and provided with a rotatable device, substantially as described and illustrated."

✓ No. XVI. THE MARK SMITH ROTARY SPRAY ETCHING MACHINE.

Abstract of a paper read by G. Venner Dear at the Bolt Court School.

WHEN asked to give this paper I refused, on the ground that a practical process man would better be able to do our machine justice and to interest the hearers. However, on it being pointed out that my experience in getting these machines started in many of our process houses, with the little troubles and difficulties we have had to contend with, might be of interest to the trade, I consented to be in this position to-night.

During the last two weeks we have listened to some exceedingly interesting papers on two of the etching machines of foreign make, and it is now my pleasure to put before you some claims and details of the only British made etching machine on sale. The inventor, Mr. Mark Smith, is a Britisher, and every part of the machine is manufactured in England; and at a time when there is so much talk of foreign competitors entering our market, and when we are so used to expect that every improvement in methods and plant used for the printing and allied trades emanates from Germany or America, it is gratifying to find an English machine at the top of the tree and holding its own against all competitors.

The original intention of Mr. Mark Smith was not to produce a machine to save time or to give better work, but to improve the conditions existing in his own works from the point of view of health. Mr. Smith's works in Manchester are in every respect "model" works, and he is greatly interested in improving conditions. When he had concluded his experiments in this direction and had evolved a machine of the same type as is now on the market — although, of course, the details of the machine have been altered and improved since the early patterns—it was found that a considerable saving in time and a great improvement in quality of work also resulted.

This, then, is how the Mark Smith rotary spray etching machine had birth.

Probably many of the people here to-night have seen our machine, but for the benefit of any who have not, I will give a general description.

The zinc machine consists of a rectangular stoneware trough specially glazed to withstand the action of nitric acid. Through the longer sides of trough square holes are cut to allow the spindle to reach the motor on one side and the bearing on the other. The core of the square shaft running through these holes is of steel, covered the whole length with aluminium until it reaches the motor on one side and the bearing on the other, and is turned taper or cone shape on each side, commencing where the blades end, in order that when running the acid will travel to the greatest periphery (*i.e.* the base of the cone) and there drop off into trough, thus obviating any possibility of the solution running down on to the motor or other unprotected parts outside trough whilst running. There is, in addition, a small shield fitted to the spindle, in order that when same is stationary any drippings shall be prevented from reaching the working parts. To one end of spindle a ¼-h.p. motor is coupled direct, giving a speed of 1650 to 1750 revs. per minute, and the other runs into a suitable bearing on other side of trough. Of course, the steel core engages the bearings, not the aluminium. To the square side of the shaft four aluminium floats or paddles are bolted at equal distances, the bottoms of these floats being turned up to form a cup running their whole length, and the cavity thus formed is perforated with a large number of small holes at equal distance.

Then, near the top of trough, we have an aluminium frame or plate-holder, fitted with easily adjusted cross-bars, which hold the various sized plates face downwards, and extra cross-bars can be provided to take a number of small plates at the same time. Our machine is, I believe, the only machine in which plates are etched face down, which will take a number of small plates at the same time. The bars can be adjusted by distances of ¼ inch from the largest plate possible to the smallest.

At the top of this holder again we have the aluminium cover fitted, and this is provided with an ample lid, to allow large plates to be put in and taken out. At the top of each trough is fitted a coated wooden flue to allow the fumes to be carried direct into the outer air. Not only this, but it acts as a ventilator for the whole room. Practically no fumes at all escape into the room (except, of course, when lid is open), and after the recent report of the convention of the International Photo-Engravers' Union of America, formed to investigate the causes of consumption amongst the etchers there, when they found that the mortality from this disease, which they called the "White Plague," was between 60 and 70 per cent. above the average for other trades, and considered a great deal of this was due to fumes arising from the action of acid on zinc and lead, this fact alone is, in my opinion, sufficient to warrant the putting down of this preventative wholesale and doing away with the guilty rockers.

I have been unable to obtain any figures dealing with this disease amongst the engraving trade alone in England, because in the statement issued by the Home Office the photo-engravers are included under one general heading "Printers." However, under this heading is shown that mortality from consumption is 60 per cent. above the standard mortality, and doubtless the engravers, unfortunately, represent a large proportion of this average.

The troughs are fitted with a suitable outlet at bottom for emptying, and the whole is mounted on a heavy wooden table of convenient height, on which is also fitted the starting and other switches, so that the whole machine is self-contained and only needs a wire run from the nearest supply. There is no other fitting or fixing necessary.

(*To be continued.*)

✓

Inks for Half-tone.

Abstract of a lecture at the Bolt Court School by Mr. C. I. Smythe, of Messrs. Mander Bros.

(Concluded from p. 102.)

LUMINOSITY AND PERMANENCE.

ONE of the greatest difficulties so far has been to make inks of the necessary luminosity and at the same time of sufficient permanency to be of practical use, and in talking of permanency one must not forget that it is only a comparative term, such a thing as absolute permanency in a printing ink being practically non-existent. There is a very large amount of work of an ephemeral character, which does not require permanency as the printing ink maker understands the term, and in such a case it is not difficult to make printing inks of exceeding luminosity almost reaching the ideal. On the other hand, much work has to stand exposure to strong sunlight. It is chiefly direct sunlight which causes fading in colors, and where the difficulty comes in.

The primary colored lights are red, green, and blue-violet, and the ideal inks must be complementary to these—that is, they must be green-blue, magenta and yellow, and these must form, by admixture, the secondary colors violet, blue-green, and orange-scarlet. There is comparatively little difficulty in obtaining a yellow of the right shade and requisite degree of luminosity and permanence, but when one attempts to produce the magenta and green-blue one is faced by an exceedingly difficult task. Perhaps the brightest colors of these two shades in existence are the aniline dyes Rhodamine B and Patent Blue A; and if gelatine films are colored with these two they will give, when superimposed, an excellent violet-blue, and when superimposed on yellow will give respectively an excellent scarlet and green. In the first place, however, both of these dyes are of an exceedingly fugitive nature, and are therefore wholly unsuitable for making three-color inks. Assuming, however, that they were sufficiently permanent, we should not necessarily have solved the problem, for no water-soluble aniline dye can be used for printing ink without first forming it into a pigment lake. This would take place on a suitable substratum by precipitation, and the lake would then have to be ground into varnish in the usual way. This process necessarily detracts considerably from the purity of tone, and when the ink is printed from a block made up of fine dots one loses more than half the original luminosity of the dye.

It is a curious yet almost universal rule that the greater the luminosity and brightness possessed by a color the less its permanence, and the above two dyes, along with many others of almost equal brilliancy, are for most purposes barred to the ink maker, who consequently has to use less brilliant but more permanent materials, with a corresponding loss in the brilliancy of his inks, and you will find that the most difficult subjects to reproduce by the three-color process are not those which show heavy masses of solid color, but those where very delicate and pure tints have to be reproduced: such, for instance, as are found in flower subjects.

I think the complementary series of three-color inks brought out by my firm are as near in shade to theoretical requirements as it is at present possible to produce in permanent ink, but I must admit that even they are very far from perfection. Having, however, seen the great strides made by coal tar color makers during the last twenty years, I feel certain that sooner or later they will be able to produce dyes which will enable the ink-maker to improve three-color inks to a great extent, and if it is possible to improve upon the present half-tone process, which degrades the ink by splitting it up into numerous fine dots, three-color work should go far to sound the death-knell of lithography.

Variations in Inks.

I believe that the majority of three-color process blockmakers use various inks for proving, according to the nature of the work, and many leading printers vary their inks according to the job. Theoretically, the inks which are most correct in shade should prove the best for all work, but in actual practice this is not so, and until a perfect series of inks is produced, it will be found that an advantage is obtained by choosing one's inks according to the predominant colors in the work. For instance, a picture which contains a bright emerald green will be best produced by using a very pale greenish-yellow and a blue-green; one which contains a large amount of oranges and scarlets would require a much deeper yellow in order to produce these shades with magenta red. Where the emerald green and the orange scarlet are found in the same picture, the best that can be done is to use a medium shade of yellow, and in this case neither green nor scarlet will be quite so bright as if the inks were selected with a view to obtaining one of them alone. These facts are probably as well known to you as to myself, but I am emphasising the point, as I have heard it stated that inks which are truest in shade to theoretical requirements should be best for all purposes, whereas I am perfectly convinced that until absolute perfection is reached this cannot be the case.

"Squashy" Proofs.

Before commencing to prepare this lecture I consulted a process engraver as to the aspects of the subject which would be likely to interest students of this craft, and one of the questions he mentioned was the difficulties sometimes met with in pulling proofs. It appeared that one of the principal of these was that of the ink "squashing." The meaning of this term is doubtless well known to you, but in order to illustrate it effectively I have had a few slides made on which the dots making up a half-tone print are very considerably enlarged. The first shows an ink printed on an ordinary art paper, and you will observe that the dots in their magnified form appear more like rings, the centre of each being practically free from ink. The second, which is the same ink on a chromo paper, is equally bad. The third is an ordinary printing paper, and here you will notice that the ink shows very little appearance of squashing, but that the fibres of the paper do not allow of an even impression of the ink being given, and all the imperfections appear most distinctly. The fourth paper is not in such general use, "dull-finished art," and this shows perfect distribution over the surface of each dot, with no trace of squashing. Each impression has been taken consecutively from the same ink and from the same machine, the only difference being in the paper. This illustrates the difficulty which presents itself to the ink maker in supplying printing ink suitable for every kind of paper.

You will readily realise that such uneven distribution of the ink as is shown in the first two of these slides must degrade the purity of any half-tone picture, and this is particularly so in three-color work. The only remedy is for the printer to suit his paper to his ink or his ink to his paper; but in many cases it is possible to greatly improve matters by the addition of a little strong varnish to the ink, which, however, necessarily reduces its strength.

It might appear, from what you have seen, that any half-tone print which shows this squashing would be perfectly useless, but I can assure you that such is not the case, and it is only by the help of the microscope that the effect is so apparent. You have probably seen the last issue of *Penrose's Annual*, and will agree that the printing therein is exceedingly good. It may therefore interest you to see a magnified view of some of the dots forming two pictures shown therein.

These, you will observe, show the defect almost as badly as the specially prepared specimen first shown, and yet the prints themselves look perfect to the naked eye. There can be no doubt, however, that the results would have been superior in brightness and sharpness if the defect had not existed.

UNSUITABILITY OF ULTRAMARINE AND SOME OTHER COLORS.

I referred just now to the unsuitability of ultramarine for half-tone inks. The reason for this is that it contains sulphur, which rapidly eats away the fine dots of the copper surface, forming a black sulphide of copper. For the same reason, several other colors are also unsuitable, for example, vermilion, which is sulphide of mercury, and cadmium yellow, which is sulphide of cadmium. Any acid left in a pigment color will have a prejudicial effect on a copper block, and it is therefore of the highest importance that no trace of anything of this kind be contained in the ink. Moreover, any ink made from a natural earth will cause trouble in a long run, because no matter how finely it is ground, not only will the hardness of the particles injure the block by attrition, but these hard particles will gradually find their way into the interstices of the block and cause "filling up." Through their entire lack of any tendency of this kind, the precipitated color lakes, whether produced from aniline or other material, are particularly suited for fine process inks, their particles being what one might call "chemically" fine.

DOUBLE-TONE INK.

My few remarks would not be complete without a reference to the so-called double tone inks. These, as you know, are inks which give the picture the appearance of having been printed with two different colored inks—that is, somewhat the effect of double printing, where a pale solid tint is printed and a half-tone block printed on the top in black or other darker color. These double-tone inks are produced by introducing into an ordinary single tone ink a colored constituent which spreads after printing and leaves each dot surrounded with a sort of halo of different color. The one thing to be borne in mind when using these inks is, that they give extraordinarily different results according to the paper on which they are used, and according to the strength of tone in the blocks. As a rule, an ordinary coated art or chromo paper will give the clearest impression, but will not allow the double-tone to develop anything like so well as a hard calendered surface paper. Great care must be exercised in selecting these inks, as if badly made they are liable not only to set off on the opposite page, but to go through the paper they are printed on and leave a strong tint at the back.

"Collo."

"Collo" is the name given to a modified photolitho or collotype process by E. Forestier and is the title of a booklet from the same gentleman issued at 50 centimes from the office of *Le Procédé*, 150 Boulevard du Montparnasse, Paris. The author claims that the beginner can produce a hundred good prints an hour, and, with very little practice, may do twenty-five or fifty more. The advantages claimed for the process are:—

1. Absolute permanence of "Collo" plates and emulsions before sensitising.
2. Permanence of the sensitised plates for many weeks.
3. Short exposure—about three minutes in the shade on a bright day, with a negative of medium density.
4. No necessity to use a photometer; printing can be examined through the plate.
5. Whole operation, from negative to inked proofs, very rapid.
6. Absence of grain or relief, so that perfect inking is obtained with one roller, giving vigorous prints with great delicacy of detail.
7. Any number of impressions, in any color, on almost any level surface, and with or without plain margin.
8. Printing three times as rapid as from stone, prepared by the usual method.
9. Instantaneous variation of the tone of the image, if desired, during printing.
10. Ease of preparing color-prints, by local inking with various colors.
11. Easy printing of trichromes, from Autochromes and similar originals, without difficulties of registering.
12. Indefinite preservation of used plates for future printings.

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A Direct Half-tone or Lithographic Process.

Max Ullman of Zwickau states, in his patent specification, that the photo-mechanical printing processes hitherto employed are costly and tedious, and that his invention relates to a process for producing printing blocks for line or half-tone by direct exposure in the photographic camera; photographing the object direct on the printing plate which has been coated with a sensitive film of the composition hereinafter set forth. The plate is developed in the known manner, and serves as the printing block. The plates are thinly coated with a mixture of previously liquefied gelatine and bichromate of ammonium with added ammonia, which is allowed to harden or set. After exposure the plate is developed in a bath consisting of nitric acid (4 per cent.), and is then ready for use as a printing block.

The usual method is now followed, *i.e.* the plate is dried, has transfer coloring medium rolled on to it, and is then washed. The places affected by the light do not take the coloring medium, though it adheres to the places that were not affected by the light, so that the plates can be printed from direct.

I am aware that the separate working stages in the preparation of the printing plate as above set forth are known *per se*; and the invention consists in combining them in the manner herein stated with a view to obtaining a specially good result.

The process of the present invention has the advantage that the metal plates are at least as easy to handle as glass plates, and that they are adapted to print from direct, *i.e.*, without a previous transfer stage.

("The Process Photogram.") June 1909

"Parasitic Images" in Three-color Work.

By Guilio Sacco, in "Le Procédé."

Aberrations and "parasitic reflections" which have troubled certain workers are traced by Guilio Sacco to imperfections in the light filters employed, and he gives the following methods for testing the parallelism of the faces of such filters:—

1. With a micrometer giving $\frac{1}{100}$ of a millimetre we measure the thickness at the extremities of a number of diameters. On one of these diameters we generally find an appreciable difference between the two measured thicknesses. If d is this greatest difference, and D the length of the diameter in question, the condition $\beta \leq$, 1 minute, may be replaced by the equivalent condition

$$\frac{d}{D} \leq 0{\cdot}0003$$

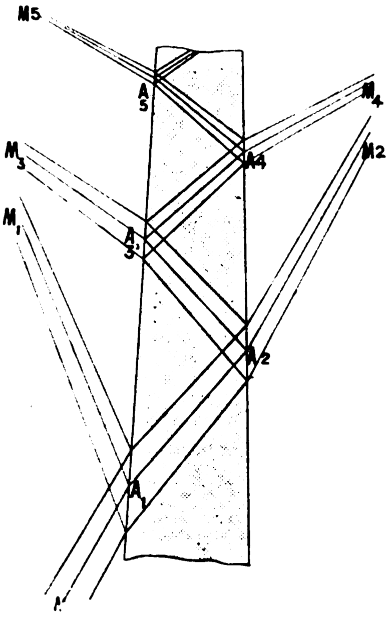
($\leq$ being taken to mean inferior or equal to).

This method does not give sufficient accuracy for light filters measuring less than about 35 millimetres in diameter, but its simplicity is such that it may always be adopted as a preliminary test, whatever the size of the light-filter.

2. One can appreciate with the naked eye the angle made by the directly refracted ray $A_1 M_1$ with the rays which emerge after traversing the light-filter $A_3 M_3$, $A_5 M_5$, etc. To do this the observer places himself at a distance from an intense light proceeding from a small source, preferably a Nernst lamp, looking at the edge of the light-filter which is held vertically near the eye, and tries to see the image of the source of light on the first surface of the filter; then, turning the filter in its plane between the fingers, if the observer has normal sight and sees only one image, the light-filter may be considered as plane parallel. If the angle of the filter is great, one sees on one side or the other of the principal image the colored image made by the pencil of rays $A_3 M_3$. Also if the angle of incidence is very great and the filter sufficiently transparent, the images given by the pencils $A_5 M_5$ will be seen. The observer who examines many filters under similar conditions and who always measures the angle, will soon be able to estimate the angle with the eye and cease to need to measure.

For more precision this observation can be made with a glass, before which the screen is placed at 45° to act as a reflecting mirror. The sensitiveness of observation is dependent upon the magnifying power of the glass.

3. A telescope being pointed to a small, distant source of light, one covers about half the object-glass with the filter to be tested, when, if the filter is prismatic, two images will be seen. Their angular deviation is proportional to the angles of the faces.



Three-color Printing.

An abstract of a lecture at Bolt Court School by Mr. J. R. Riddell.

(Concluded from page 114.)

AUTOMATIC FEEDING.

All printers know how useless it is to expect the best results when one has a feeder who is slovenly or careless. We have all had our bad half hours through this cause, and often the spoilage is a very serious matter. Let me recommend the Cross automatic feeder for accurate and perfect color printing. I have reason to be thankful that I had the courage to give this fine machine a trial. It is not difficult to adjust, and the work it produces in color work is certainly a stage nearer perfection. One usually puts a feeder in to get increased output, but those under my care were put in for fine accuracy of register and improved work. Still there is a marked increase in turnout.

I had strong feeling against automatic feeders, as most of us have who have tried the other sorts, but my personal opinion is, to get the best color work you must use an automatic feeder. It will not get tired and throw the sheets in in any slipshod manner. It will not get "sulky" and spoil work if you do not promise it an increase in wages, and it will not double roll your work and give you varying color-tones in a job.

CONTROL OF COLOR.

Keep a regular flow of color. Do not think that because the detail of the yellow is not easily seen, that it will not matter; in fact, if anything it ought to have the most particular attention paid to it.

Give close attention to the printing in all colors, and stick fast to the passed sheet. It is sometimes necessary that inks must be altered to suit the paper. Go about the alteration in a scientific and workmanlike manner, and keep a note of what has been done, because there is every chance that another supply will be required sometime in the future. Do not put anything in the first two printings in three-color work that will make the prints become dry and glossy.

Keep the machine-room at an even temperature, from 65° to 70°. Keep the room at this temperature over week-ends and on holidays.

ORDER OF PRINTING.

The ideal way of printing process color work would be to allow the same man to print each of the colors on the same machine running at a regular speed. But modern demands seldom allow for this. We must run our work in series: that is, have a machine for each color, with an interval between the superposing of the printing of the following colors. This certainly increases the difficulties in obtaining first class work, but, like everything else, this can be reduced to a minimum by giving attention to all details. Note that all the lays come in exactly same printing in each of the machines. This is absolutely necessary to ensure good register. Paper may not be "square." Particular attention must be given to the drying of the inks so that they will be in the proper condition for receiving the next color. Let me again repeat the necessity for preserving the printed sheets from the atmosphere.

THE IDEAL METHOD

is the printing of one color on the top of the other, and obtaining a finished print before the sheet is delivered. This is known under different titles, such as tandem, citachrome, and simultaneous printing.

If my opinion were asked by those likely to take up this method for first class work, I should give "Punch's" famous advice to those about to marry, "Don't," and I have had practical experience in the matter. In theory it is correct, but in practice it is far from satisfactory. In this method of printing there is a great loss of color values, sharpness, and brightness. This class of printing can never be mistaken.

Most of us who are working away at this method have our own particular mixtures of inks, etc., but chemistry has not yet been able to supply us with inks that will "lift" properly, and give the same color values all through a job, even if it is only a thousand run.

MACHINERY FOR TANDEM PRINTING.

The machinery on the market for this particular class of work is not all that it should be, so much is left to chance rather than being positive in its actions. I do not think that I am exceeding the privilege accorded me in mentioning a new type of machine built by Messrs. Cottrell of Rhode Island, U.S.A., which I believe to be the best yet made. There is a large cylinder with grippers which take the sheet and which does not let go of it until ready for delivery. As the sheet passes around the cylinder, it receives its impressions for four sets of plates fixed on small cylinders, to each of which is connected a full equipment of inking rollers with ink duct, etc.

This machine requires special plates, and the work which I saw done on the machine was distinctly above the usual run obtained by this process, but again a great deal depends upon the subject.

I believe there must be a great deal of water run under the bridge before this process can claim to be successful, even for ordinary work. Whether it will ever compare with high-grade three-color printing I "hae my doots." Still, it would be of great assistance to the process printer. Could he see the finished result being delivered on the board of his machine, it would remove many of his difficulties and worries.

Cost and Selling-price: A New View of a Very Old Subject.

THE "PLATE-MAKER'S CRITERION" has taken up the question of cost and price; and has the following to say:—"Too many cooks spoil the broth, and too many doctors kill the patient. Is the photo-engraving industry going to be killed by its misguided 'friends'?

"First of all, let us see what our real troubles are, and why. Photo-engraving is an art of reproduction; it creates nothing. The best it produces is a good imitation. Its exploiters, both capitalists and workmen, have ever been imitators. The process itself is based upon photography, lithography, and wood-engraving. There you have its start. When photo-engravers in the beginning made plates they knew nothing of their value to the buyer. In some cases they based their selling price upon what, in their opinion, a woodcut of the subject would have been worth. Since they were able to produce the plate much faster and at less cost than the wood engraver, they *sold* it at a *cheaper* price. Others again, not knowing anything about the cost of woodcuts, and not wishing to exercise their brains to any extent, found the electrotyper's scale to their liking and sold plates for so much per square inch. To make matters still easier for themselves and their customers, for whom they always had an unusual fondness, all photo-engravers soon sold their products on the square inch basis. In the meantime art departments were added to engraving establishments, and to save arguments, art work was reckoned as time labor, the hour rate, incidentally, falling below that demanded by a first-class plumber, carpenter, or bricklayer. Since printers think nothing of furnishing dummies of booklets, catalogues, etc., free of charge, not to be outdone, the engraver next furnished sketches on that munificent basis. Then arose the printer and demanded a discount on all work. It is needless to say he got it. The publisher made a similar demand with like results. Every line of business buying cuts in any quantity, real or imaginary, came in for their bit, which was readily granted—to be a good fellow as it were. Then came back the publisher and turned another trick. After obtaining an unusually low rate, he next bilked the engraver for an advertisement in his 'valuable' publication. Do I have to tell you again he got away with it? Of course he did. Now comes the advertising agency—and here's where everybody fell. Disgruntled artists and salesmen next appear on the scene, running their own establishment, offering the purchaser 'personally conducted' cuts. Their peculiar graft consists of demanding better plates at lower prices — and they are accommodated. The wise ones now maintain no delivery force of their own whatever; the engraver does it for them. Last, but not least, are the post card people, who can buy half-tones cheaper than anyone else ever thought of, for some unknown reason or other. There seems to be some attraction about their work, for there certainly are no profits connected with it. But why continue in this strain? You can supply all the missing numbers yourself.

"No one will deny the truth of the foregoing statements; and further still, no one —not even the purchasers—can justify the existence of the beforementioned conditions. Then why are they allowed to continue? Or let us see why they were ever permitted to spring into existence. Two elements enter into price-cutting— the purchaser demanding the lower price, and the salesman who grants it. We will leave the purchaser out of the question, it being to his interest to buy for as little money as possible. It is reasonable to assume that no one would repeatedly sell an article when such sales result in continued losses.

"It then logically follows, that low prices are made in ignorance—ignorance on the part of the proprietor and his representatives. This ignorance does not only apply to the cost of production, but to the value of the article to the purchaser, prevailing trade conditions, and the honesty of competitors. Can anyone explain why large buyers of engravings can purchase year after year plates at a price ruinous to the engraver, by simply asserting that a competitor will sell them at that rate, even telling his name and the price quoted? This in face of the fact that the competitor can be reached by telephone in a minute, for a verification of the statement? Unfortunately, a twelve dollar a week salesman can go amongst buyers and in five minutes establish a rate that will become the recognised one for the future, and this happens only too often.

"What is really wanted is not reform; we've had plenty of that. Not pet theories; we've had our fill of those as well. Committees and conventions will accomplish nothing but—talk. We've all been talking for years. What good has it done? We need common sense and action. No one can tell me that the men engaged in the engraving industry differ from other human beings. The trouble has been lack of leadership, unfounded suspicion, and ignorance. Let us all set out to do something. Throw aside your prejudice and *harmonise*! As soon as the employers solidify themselves for the betterment of the industry they will present an irresistible force and their efforts will be crowned with success."

[Which is exactly what the despised "reformers" and "theorists" have been working and arguing for, for years. So we all agree!—Ed.]

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Process Blocks: Good and Bad.

One would fain believe that process blocks were like whisky, about which the Kentuckian judge said, "There's whisky, *and* whisky, but there's no bad whisky." However, Mr. H. E. Atkins, managing director of the Dux Engraving Co., Ltd., of Glasgow, is persuaded that there are two or three kinds of blocks, and in a lecture to the Printers' Managers' Association he explained how they may be distinguished. His advice may be epitomised as follows:—

"It is perhaps best to begin by comparing the ideal process block with the inferior article. Its manufacture requires skill and care at every stage of production, and these stages are numerous. Good work in one department is easily destroyed by indifference or lack of skill in another, and granted the processes of negative making, printing, etching, and engraving have been satisfactory, the effectiveness of result may be weakened by inferior mounting. The need of skilful manipulation throughout the entire process contradicts the oft repeated statement that modern illustration methods destroy the painstaking care and skill displayed by the earlier school of hand engravers. The real effect of the modern processes has been to enlarge and change the sphere of the intelligent workman, for whereas in earlier days he devoted his whole time interpreting a copy by hand work, requiring, of course, an artist's skill, the modern methods demand scientific research combined with a skilful application of such research, and this combination requires as much patience, energetic application, and personal skill as was at any time evidenced by the earlier engravers.

"Detection of faults in an imperfect block is very easy before an impression from the block is pulled, if one uses a magnifying glass, a good half-tone block as a standard of comparison, and a quantity of fine whitening.

"The points to be expected in the good block are (1) solid blacks graduating into the next tone; (2) middle tones to give softness and body; (3) small high-light dots, so small as to be almost invisible to the naked eye when printed, and in the case of vignettes dots gradually diminishing in size until at the edge they are as small as possible; (4) good printing depth; (5) sound dots; (6) level mount.

"Having such a block by you, rub a little of the whitening over the surface. This remains in between the dots and assists your examination. Treat the doubtful blocks in the same manner. Get your magnifying glass and compare. The blacks, as already suggested, in the ideal should be solid. If your examination detects dots filled in with chalk, then your blacks will print grey; in like manner it will be easy to judge if the high-light dots are too big. If the whitening refuses to remain in the block, but easily rubs out, depth is lacking. Should the whitening remain in the greater part of the block, but rub out easily in certain of the high-lights, the etching has been carried too far in these parts, and they will soon dirty in course of printing.

"The whitening can be easily removed from the blocks by brushing a weak solution of nitric or acetic acid over the surface and then rinsing under a gentle flow of water, taking care that the amount is kept as free from moisture as possible. The condition of the mount can easily be discovered by pulling a light impression on a properly adjusted press. If certain portions of the block do not make their appearance and it is not reasonably level, return to the blockmaker for correction. It is no part of your work to remedy a defective mount.

"As to color work, no better suggestion can be made than that of the importance of correctness in each color block, a correctness which must be in accordance with standard printing inks. It is not a bad policy when ordering tri-color blocks from the engraver to send a sample of the inks you are using. Then another point is to make sure that the proofs supplied are proved of uniform strength; this is especially important when a number of blocks are to be printed in one forme. For my own part, if in examining proofings of half a dozen or more color sets (whether to be printed in the one forme or not) it was noticeable that a different shade of blue, red, or yellow had been used in one or more cases, I should return these blocks for treatment in accordance with the others.

"An item of importance in preparing the blocks for printing is to ensure that the wood is level. Should there be any warp or rock in the wood, send it to the nearest engraver for treatment. No underlay other than that necessary to bring the block type-high is permissible, especially if it has a tendency to interfere with the firmness of the block base.

"Before overlaying a block make a clean impression, proved for the high-lights, and then ply up the blacks where necessary. I have seen some printers attempt to judge the overlay required from an impression pulled heavily and with dirty ink and rollers. First see how nearly a careful impression represents the block, and then act accordingly.

"In the case of interlaid vignettes special care is required to adjust the pressure, as no matter how hard the wood may be, careless treatment will force the interlay into it and waste your work.

"There are one or two fallacies in connection with the treatment of vignetted edges. One is the use of vignetting hammers or punches in the actual edges of the blocks; and secondly, the use of etching material to reduce the dots round edges. Far better substitute a method of interlay, and after driving in a number of nails or screws, punch down the edges of the block lightly (if necessary) by means of the beard only. The edges will then be nicely lowered without damage to the dots, and the nails will keep them so, throughout the printing. The objection to the second fallacy mentioned is that an experienced hand is required to manipulate an etching mordant on the blocks, and apart from this reason it happens in five cases out of six that the acid resist is not on the blocks at the edges by the time they reach the printer; and further, it is the engraver's business to see that the vignetting is satisfactory.

("The Process Photogram.") June 1909

Observations on Half-Tone Etching.

By Ben Hollenbach.

Being of the opinion that whatever knowledge may be hidden from a fellow craftsman is lost for all practical purposes, and that instead it should be disseminated whenever possible, so that our craft may rise to a still higher plane, each and every member should do his utmost and assist in this upbuilding of the vocation of our life. Members should read and study and experiment. They should express their thoughts through our journal, so that all may profit in a like proportion and place our labor values, on the whole, at a higher premium.

In order to contribute my proportion and establish a mark, several observations were made of the half-tone etching process, the results of which were tabulated in the following form:—

Temperature.	Specific Gravity.	Screen.	Etching Time.	Remarks.
35	38	133	20	More etching necessary.
40	38	133	20	
58	40	133	18	
60	40	133	16	
60	40	150	16	
61	41	133	18	
...	...	150	...	150 screen unsatisfactory.
62	41	...	16	
...	...	133	...	133 all right.
63	45	133	25	
64	38	133	15	
64	43	133	20	Shallow.
66	42	133	18	
66	40	85	30	Shallow.
68	41	133	19	
70	43	150	18	Not satisfactory.
70	41	133	20	Not satisfactory.
70	41	150	18	
72	42	133	23	
				All other plates were satisfactory.

These tests were made under normal working conditions simply for the purpose of establishing a basis upon which the relations of temperature and gravity of etching fluids (iron) to the relative time required for proper etching may be accurately determined.

Fresh iron was used in these tests at a Beaumé specific gravity of 38°, and the temperature at about 64° F. Under these conditions the best results are obtained. However, plates can be etched under varying conditions, only that the etchings will appear flattened in the shadows when too great a degree of gravity and higher temperature obtains.

In the tests tabulated the iron used was measured and the temperatare taken before each plate was etched. A small hydrometer, an ordinary dairy thermometer, and a small magnifying glass, such as engravers generally use, was the only apparatus required in making these investigations. For convenience the table for tabulation is so arranged that the temperature values read gradually from the lowest to the highest. From this others can be made, one in which the specific gravity is given from the lowest to the highest, another for the screens, and still another for the time; thus a series of "pictures" can be made that will tell many interesting things.—*The American Photo-Engraver.*

Half-tones from Half-tones.—A German method of copying, which is said to avoid moiré effect without any reference to the angle of screen in original and in copy:—Take fine ground-glass; rub the ground side carefully with glycerine, then surface polish with papier Joseph or cotton rag. Now place the ungrained side of the glass in contact with the subject to be copied, using heavy pressure, and photograph through the ground-glass, which has been "transluced" by the glycerine.

L.C.C. School of Photo-Engraving and Lithography. Report, 1907–1908.

As usual with the Bolt Court School, the Principal's report, which was presented to the Council at the end of November last, has been printed in *de luxe* style and illustrated with a very considerable number of specimens of the work of the school. Such a publication must go a very long way to satisfy any one who may still have a lingering notion that the work of the technical schools is to teach theory and not practice, for the specimens show that in the actual work of their craft the students can compete very fairly with the ordinary work commercially done in the trade. In writing this we do not wish to suggest that the students could compete as regards speed or economy of production; for, of course, these things can only be learned by long, steady work in the trade, but we do assert that the instruction is thoroughly practical, and is tested in the only possibly satisfactory way, by seeing that the students produce actual results. The appreciation of the school is indicated by the fact that the number of students was larger than in any previous year, amounting to 626 as compared with 567 in 1906–1907. A notable new departure was the arranging of courses in paper-making and stationery, for which forty students entered in the former and sixty-four in the latter course, largely as a result of the encouragement given by a few trade houses to their employés. The increasing appreciation of the school by the trade is one of the most satisfactory features of its recent work.

It is impossible to give any good idea of the specimens presented with the report, but certain new features are worthy of special mention. Quite a number of results of elementary research are illustrated. These include a set of curves showing the weight of copper dissolved in given lengths of time (from thirty minutes to four hours) by solutions of iron perchloride of various strengths from 25° to 45° Beaumé; a set of curves illustrating the light-measurements of prints obtained from copper reliefs etched in solutions of various strengths; many photo-micrograms of the results of the work of various etching methods upon zinc, and a considerable number of photo-micrograms of the grains used in different photo-mechanical processes, including cross-line screen, four-line screen, 60° screen, aerograph, metzograph, spitzertype, grained litho, collotype, photogravure, etc. Of course there is considerable wealth of half-tone and line zincography, including a very effective combination of black half-tone with green tint, made with the ordinary cross line and the metzograph screen respectively. Three-color reproduction is represented by a considerable number of good examples from very varied originals, and many of them are doubly interesting because the originals were produced by the Sketch Club or the design classes of the school.

Lithography is represented by good monochrome work, and by three very good examples in color in seven, eight and eleven printings respectively.

ORDERS, OR INQUIRIES.—"Too many firms solicit requests for estimates rather than ask for orders. This freedom of offering to quote on a piece of work causes the buyer to ask for prices and samples in many places. The buyer is only doing what you made him promise to do. Didn't you 'hang around' until he promised?"

("The Process Photogram.") June 1909

Hydrometers.

An interesting example of the conservatism characteristic of the electrotyping fraternity is to be found in the survival of the Beaumé hydrometer, which is, by a long way, the most inconvenient and the least scientific of the density gauging instruments in common use. There are very good reasons for believing that the practice of estimating the density of liquids by comparison with that of water was well known in the time of Noah, the eminent shipbuilder; otherwise it is difficult to conceive how he calculated the displacement and fixed the loadline of his marine menagerie.

The considerations which induced Mr. Beaumé to devise the scale which bears his name were no doubt in his mind sufficiently weighty to justify its introduction to the notice of the profession; but it is in the opinion of many extremely unfortunate that the simple scale directly indicating density compared with water was not adopted in its place.

There are two Beaumé scales—one for liquids lighter than water and one for those heavier. Engravers are interested in the latter, and we will confine our remarks to this.

Published tables of comparison between degrees of specific gravity and degrees Beaumé usually differ slightly from each other, but they all appear to be based on the following equation :—

$\text{s.g.} = \frac{144}{144} - R$, where s.g. is the specific gravity with reference to water, and R is reading in degrees Beaumé. By transposing we get—

$$R = 144\left(1 - \frac{1}{\text{s.g.}}\right).$$

Hence, on the Beaumé scale water gives 0°, and a liquid twice as heavy as water gives 72°, while to convert one scale reading to the other the following operations are necessary :—

Beaumé to specific gravity.—Subtract the reading from 144 and divide 144 by the difference.

Specific gravity to Beaumé.—Divide 144 by the reading and subtract the quotient from 144.

There is no *apparent* relation between the figures indicating on Beaumé's scale the density of a liquid and the figures showing its actual density (water = 1); and that shown in the above equations seems to be quite arbitrary.

On the contrary, Twaddell's scale is selected with the express object of enabling the user to find the specific density without unnecessary computation, 1° Twaddell representing ·005° of s.g. (water = 1·000).

Twaddell's hydrometer has, in common with Beaumé's, the defect that in use water gives zero, on the scale, which means that *either* two distinct instruments must be provided for liquids heavier than and lighter than water, *or* positive and negative readings must be taken on the same instrument, either method providing an obvious source of possible errors in the hands of inexperienced observers.

The most perfect scale is undoubtedly the direct reading specific density scale where water reads 1·000, and the user is saved all reference to tables and computation.

A SCHOOL OF COSTS AND ESTIMATING has been established by the United Typothetæ of America, and is issuing forms and instructions to printers who wish to be *quite* sure about "cost and selling price." It is suggested that where there are ten or a dozen printers in a city they should combine to support a central office for estimating, and that such an office, estimated to cost £600 a year, would pay for itself over and over by the prevention of inadvertent price-cutting.

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A Patented Photo-litho Process.

Hermann Schneider claims a patent for a process of transferring a photographic image direct to stone or metal for lithographic printing; that his process gives results which are perfect as to gradation of tint and fineness of modelling, reproducing all the detail and tone of the photographic negative. The stone or metal is first finely grained by the ordinary methods and prepared with a weak solution of nitric acid, and is then dried quickly. It is slightly warmed, and the surface thinly covered with a preliminary coating of gelatine, the stone being then maintained at a temperature of 104° F. until completely dry. A solution of

Albumen - - -	20 c.c.
Saccharic acid - -	10 ,,
Water - - - -	200 ,,

is then applied over the substratum of gelatine and dried. Two other solutions are prepared, viz.—

A.	Chrysanaline - -	2 grammes
	Chloride of zinc -	50 ,,
	Water - - -	1000 c.c.
B.	Bichromate of potash	14 grammes
	,, ,, ammonia	30 ,,
	Water - - -	1000 c.c.

For use a mixture of equal parts of A and B is taken, and the solution is flowed over the stone, which is then raised to a vertical position to allow the excess to drain off. When dry, the exposure is made under a photographic negative; in a good light of normal intensity the exposure varies from ten to fifteen minutes. A special ink is made for rolling up consisting of convenient proportions of lampblack, Venice turpentine, and black lithographic writing ink, mixed while hot, and to which is also added a paste composed of bitumen and resin powdered very fine, and beef fat. This ink is well distributed with a hard roller, and the surface of the stone well rolled with it all over. The image is developed by passing very lightly over the surface of the stone a sponge saturated with water. When the print has been developed clean, gum and dry. Sponge over to remove the gum, clean off the ink with turpentine, and etch with a weak solution of nitric acid to remove the sensitive film. Keep moist by the application of salt water, ink up with a lithographic roller, and make ready for proofing by the usual methods. The photographic image is applied directly to the stone, the sensitive coating being destroyed by nitric acid before the last inking. In the ordinary photo-lithographic process on stone the photographic image receives the ink; but in this process the stone itself, cleaned by the acid, is inked and renders the print.

Some (Im)pertinent Questions for Heads of Firms.

Did you draw last year as good a salary as you would if working for another, and did you get paid for the overtime you put in?

Did you clear, over and above your salary, interest at 6 per cent. on the money you have invested in the business?

Have you provided a fund for the purchase of new plant in case something better is needed, or for removing to more convenient premises?

Is your plant as good in every respect as it was last year?

Have you laid aside money enough to replace what may break or be worn out?

Have you, in addition to the above, made a fair profit on the work you have done?

If so, happy man! Go right ahead.

"Tips" and "Wrinkles."

Payment is offered for brief practical notes and suggestions,—just those thousand-and-one little things that go to make work easier or more successful or more profitable.

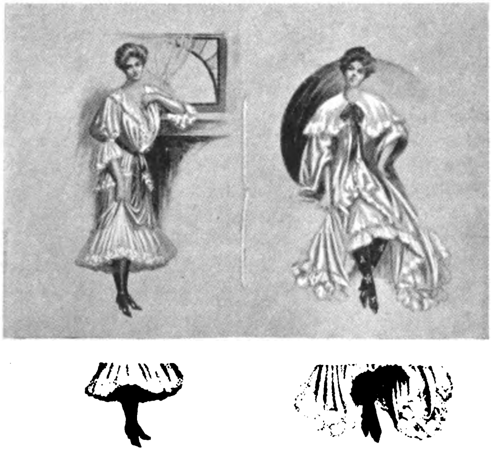
Half a guinea will be paid, on publication, for the most useful "tip" contributed in any month; and other payments of 5s., 2s. 6d., 2s., and 1s. are offered.

Every "tip" accepted will be paid for, and the payment will be governed by the apparent usefulness, *not* by the length. Three lines may be better than thirty.

Rules.—Write on one side of paper only. Each "tip" on a separate sheet or sheets, with the name and address of the sender, which will be published or not, as desired Address to "Tips," c/o the Editor, *The Process Monthly*, 6 Farringdon Avenue, London, E.C.

A NEW FORM OF PRICE LIST is issued by the Central Engraving Company, Cleveland, Ohio, and consists of a metal-bound sample hanger instead of a specimen book. Five different sizes of blocks are represented, with four different styles in each size, namely, square, oval, silhouette, and vignette. Under each proof is the price for a block of the size and style represented. In the minimum, for instance, the square finish is $2, $2.50, silhouette $3, vignette $3.50. This is a good way of reminding customers that variety in finish may help to give attractiveness to a job, and at the same time pointing out to them that the special finishes cost more than the ordinary square finish.—*Exchange*.

HOSIERY ADVERTISING has been presented with a smart little idea which is illustrated by the accompanying cut from *The Inland Printer*. A little booklet consisting of one stiff, large page, with five folding little pages, has the figures of two ladies printed on the large page, while each of the smaller pages has skirt-edgings and stockings for two figures. By folding down the five small pages in turn, until the large one is reached, each of the ladies is fitted with six different pairs of stockings. Really, this method does not tell so much about the hose as would be done by the usual method of illustrating the stockings only. But it is novel; it rivets the attention; it fixes the name of the hosier in the memory. Therefore: good advertising.



And the good blockmaker is a producer, as well as a re-producer of ideas.

School Notes.

TECHNICAL PHOTOGRAPHY is proving a strong and popular feature in the work of the Bolt Court School. The lectures are supported by practical demonstration on Saturday afternoons, photographing architecture, paintings, machinery, landscape, museum objects, etc.

BOLT COURT AND THE MANCHESTER MUNICIPAL SCHOOL vary somewhat in their methods, for while the former attempts only to give practical instruction to those who wish to use the knowledge in their daily work, the latter gives lectures and demonstrations to those whose interest is keen but less direct. As will be seen from another paragraph, the Manchester school has arranged two special courses to explain blockmaking, printing, binding, etc., to those who are connected with the trade as printers and publishers of books. Bolt Court is barred by want of space from doing much similar work, but there can be little doubt that any craft is the better for its members having some knowledge of the kindred crafts. For instance, even the maker of half-tones is all the better for knowing so much about the making of papers and of printing inks as has been given in lectures at Bolt Court.

TO INTEREST PRINTERS IN PROCESS WORK the Manchester Municipal School of Technology is running two series of lectures: firstly, a course dealing with the photo-mechanical production of "supplements" and "plates,"—other than illustrations printed with the text. This course is intended for those who are interested in the production of illustrated books of various kinds, from the pictorial handbook to the *edition de luxe*. For those who have no opportunity to acquaint themselves with the advantages of the different methods which are available, these lectures, illustrated, as they are, in the fullest possible manner, should prove of value.

Syllabus:—The collotype process and its applications. Intaglio half-tone work. Photogravure in line and tone. Woodburytype. The photo electrotype. Ordinary photographic prints for small editions. Map and plan printing. Chromo-lithography. The varnishing, mounting, roughing, and other finishing operations in general use for high-class work.

The second course, on the production of an illustrated book, explains and demonstrates the usual methods employed in the making of the complete volume, from the typographical composition to the final binding, and is fully illustrated. Its sections are:—(1) Processes of illustration in monochrome and color, Mr. Fishenden; (2) typographical composition by movable type and machine, Mr. W. Buckley and Mr. C. Doughty; (3) proof reading and correction, and the arrangement of the text matter and illustration, Mr. James Begg: (4) making electrotypes and stereotypes of the type matter and illustrations, Mr. J. Evans; (5) the production of the printed sheets at the press and machine, Mr. J. Davidson; (6) the treatment of the finished sheets, and binding of the edition, Mr. W. Mellor; (7) the extra binding of library copies, and the ornamentation of extra bound books, Mr. Will Mellor, jun.

So far as is practicable the processes of typographic composition, printing, and binding are shown during the course by the production of a sample volume.

Brevities.

An Albert Etching Machine has been installed at the Bolt Court School alongside the "Mark Smith," which has been in constant use there for some considerable time.

Acmetint is the latest title for fine blocks made with irregular grain. It is being vigorously pushed by the Acme Tone Engraving Co., and we understand that it is attracting a good deal of interesting work to Watford.

The Business of the Quick Photo-Engraving Company, Indianapolis, has just been sold to the Hoover-Watson Printing Company of the same city.

The New Zealand Survey has just added a new 24 x 20 process camera to its outfit. The camera is of the Arc Gear pattern, built and shipped by Hunters, Ltd.

The General Engraving and Printing Company, Portland, Maine; capital 10,000 dollars (£2000), has just been organised by H. D. Fickett and E. H. Thompson.

Monterey, Mexico, has a new photo-engraving company which has just started with a capital of £2000 and is said to have ordered the whole of its outfit from Germany.

A Conference on Photo-Engraving will be one of the great items at the Dresden Exhibition. Of this we hope to give further particulars as soon as the date is fixed.

The H. & R. Process Engraving Co., Ltd., is registered with a capital of £2000 in £1 shares to take over and carry on the business of A. T. Robinson, conducted under the name of Hudson & Robinson, 21 Camomile Street, London, E.C.

Printing-Trade Terms Explained is the title of a series of ingenious advertising blotters issued by the Arthur Cox Illustrating Co. It deals with such subjects as "Costing, Clock, Creditors, Copy, Chapel, Devil, Deposit, Debts," giving a humorous definition of each.

"Successful organisation work means the full co-operation of the members, the putting aside of all personality and striving for the general uplift of the business. Nothing can be accomplished by allowing some to sit idly by and criticise those who do things that tend to make organisation a success."

In spite of the tariff, the Wratten Process Panchromatic Plates and Light Filters are gaining ground in the United States, and the sole agents (Hunters, Ltd.) inform us that their use is growing very rapidly in this country, as well as in the Colonies and on the Continent of Europe. They are satisfied that collodion emulsion is being rapidly superseded for three-color work.

The Schrell & Pierson Studio has just been established at 5 Beekman Street, New York, by Paul E. Schrell and Frank Pierson, who have been officers of the Central Bureau of Engraving for many years. They intend to undertake only the production of copy, including photographing, wash drawing, pen and ink work, retouching and working up, etc.

The Convention of the International Association of Photo-Engravers will be held at the Hotel Kaaterskill in the Catskill Mountains on July 6th, 7th, and 8th. The Convention is expected to be decidedly the most interesting ever held by the Association, and the secretary informs us that members from Colorado, California, and the Canadian North-West have arranged to attend.

Hunters, Ltd., have just made further extension of premises, taking an additional floor at their offices and warehouse in Poppin's Court, as well as a new floor at their London factory and repair-shop in Harp Alley. The new Harp Alley floor is being devoted to show-room purposes. Amongst their new lines will be found the new 1909 model of the Arc Gear camera, which we hope to describe and illustrate next month.

Columbia House, Shoe Lane, E.C., is the new home of John Swain & Sons, Ltd., whom we congratulate on the steady growth that gradually filled No. 58 Farringdon Street, overflowed and nearly filled No. 57, and now demands further space, in spite of the constant growth of the fine factory at High Barnet. All congratulations to Messrs. Dargavel & Holt, who have builded so well on the broad and firm foundations laid by the late John Swain.

"Electric Lamps," by Maurice Solomon, A.C.G.I., A.M.I.E.E., price 6s. net; London: Archibald Constable & Co., Ltd., 10 Orange Street, Leicester Square, W.C.—Electric light is such an important factor in the modern process shop that every responsible manager who wishes to make the best return possible upon the money with which he has been entrusted should have a fair knowledge of electric light matters. While Mr. Solomon's book contains a good deal of information that may perhaps not be considered absolutely necessary for the process-engraver, his chapters on the construction, the theory and means of testing of various electric sources of light, should be read with interest, and should help toward the intelligent understanding of those problems which directly affect the "practical" or financial side of the question. The book is evidently the work of one who is very familiarly acquainted with all the principal forms of electric lamps, and it displays clearly the advantages, as well as the weaknesses, of the different systems, together with their suitability for various purposes. It is well supplied with tables and diagrams, and while it naturally cannot be considered as light reading, it should be perfectly intelligible to the layman.

The Kittredge Copyright Bill, which obtained the signature of President Roosevelt on March 4th last, and becomes the law of the United States on July 1st, has certain provisions which will affect the European engraver and electrotyper. Under the old law, copyright could only be granted to books of which the type had been set in the United States, but it did not seem to be necessary that the engravings should also be made there. The new Act provides for this, with the result that a certain amount of engraving for the American market will be adversely affected. The new law specifically provides that "if the text be produced by lithographic process or photo-engraving process, then by a process wholly performed within the limits of the United States; and the printing of the text and the binding of the said book shall be performed within the limits of the United States; which requirements shall extend also to the illustrations within a book consisting of printed text and illustrations produced by lithographic process or photo-engraving process, and also to separate lithographs or photo-engravings, except where in either case the subjects represented are located in a foreign country and illustrate a scientific work or reproduce a work of art." An important point for the American engraver and printer is the effect that the new law will have upon picture post cards, of which nearly all the better kinds have been imported from England and the Continent of Europe.

Process Wages in Germany.—The process business in the Fatherland is controlled by very rigid agreements between the union of masters and the union of men. The last agreement was made in 1904, and ran for five years; during that time the number of men affected rose from just under 800 to well over 2000, and it is now stated that less than 4 per cent. of the employés in the whole trade are non-union workers. There are 142 process-engraving firms, of which 136 are members of the Employers' Association. This year the photo-engravers' hours of work have been reduced from 8¼ per day to 8, and though the copper-plate men are still working 8½ hours per day, the agreement reduces them to 8¼ at the beginning of next year. The minimum weekly wage for engravers is 27s. and for copper-plate printers 30s., with slightly increased minimum in certain cities and towns where the cost of living is supposed to be high. One apprentice is authorised with every four negative-makers and fine-etchers, and one to every five etchers. The masters are bound by their Association to keep the prices for all blocks and plates above certain agreed minimum rates, and any house convicted of cutting below these prices is liable to be struck off the membership of the Association, which will mean that union men will no longer continue in its service. A few of the employers objected to the establishment of the minimum, but the men's union was so strong that the majority of the masters were able to carry their point. A Tribunal of Honor, consisting of members elected by the employers and the employed, deals with all questions of alleged price-cutting, etc.

Correspondence.

THE FUTURE OF PHOTOLITHOGRAPHY.

The Editor, "The Process Engraver's Monthly."

Dear Sir,—With reference to the above, which is practically dealing with the future of the lithographic trade, there is no doubt to my mind that the outlook for this branch of the printing trade is very gloomy indeed. The blame rests with the trade as a whole. In the early days of the three-color process blocks the lithographic trade ridiculed the idea of three-color work; to-day they are finding the three-color work a very keen competitor. The result is the trade is finding out their antiquated methods, with their stones, their stipples, and mediums being left behind. The very men that have been brought up to color printing, and in some cases being their lifelong study, are being ousted by printers who are practically new to color printing. From what appears now and again in the trade papers the litho trade seems to be awakening out of their slumber and looking for the process man to help them to the front again. If ever the litho trade makes up for the ground they have lost, it will be only by the process man's method, and not their antiquated ideas, and no wonder your correspondent says, "They are in the same position as when Senefelder left it." Your writer mentions that some firms have spent thousands of pounds in trying to introduce photography into lithography, but is it not a fact that some houses have put out litho machines and laid down letterpress machines and are printing their color work by the three-color process? If the litho trade is to make any advance at all they must get out of themselves, and leave their antiquated methods, and look for something new to them, and be determined, if any headway is to be made at all, and nothing so certain. I have read with interest the articles on "Photography as applied to lithography," but I am certain there are better methods, with materials at their finger ends, and a better royal road to that end as far as color printing is concerned. My point is, that if the litho trade would look beyond themselves, then I am certain they might be able to rival the letterpress. They talk of what the Germans are doing; why don't they do likewise? When I myself have done work for the lithographic side, it amounts to this:—"I'll see what our foreman thinks about it, or what our transferer says, or if our machineman can print it"—poor infallible, antiquated beings. To my mind, either they will have to do what the process trade wants or get out of it, and then the trade will be better able to know what it can do.—Yours truly,

Another Process Man.

The Editor, "The Process Engraver's Monthly."

Dear Sir,—With reference to your paragraph about myself in the April issue of your journal I would be glad if you would allow me to state, on the principle of giving credit where credit is due, that at the time of my introducing to customers and buyers the special lines of work you are good enough to refer to, I was acting in conjunction with the old firm of Vincent & Hahn, and more particularly for a longer period with Mr. Vincent alone, with whom I was in partnership, and who had charge specially of the technical side of our business as against my control of the general, commercial, and financial matters.

Mr. Robert Vincent—some account of whose recent lecture at Bolt Court School also appears in last month's issue—is still very much to the fore, and is manager of the process department of the Amalgamated Press, Ltd.; and as we also happen to be private friends as well as former partners for a time, I trust you will be able to find room for the insertion of this communication, as I do not wish to take to myself more than is my due.

In concluding, permit to say what a very interesting number of your journal I think the April one is, and that I only regret I have not more time to peruse such matter as appears in it from month to month.—Yours faithfully,

Henry Blaikley.

Estab. Jan. 1894.
" The Process
Photogram "

THE PROCESS
ENGRAVER'S
MONTHLY
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JULY 1909.

Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly.*

✓ *Machine Etching.*

No. XVI. The Mark Smith Rotary Spray Etching Machine.

Abstract of a paper read by G. Venner Dear at the Bolt Court School.

(*Concluded from p.* 127.)

Previous articles and notes.—1906: I. Jan., Dr. Albert's Method; * II. Feb., Concewitz's Method; * III. March, Levy's Method,* and notes; IV. May, the Holmström Method; * V. June, Swain's Views on the Levy Method; VI. Sept., W. G. Thorpe's Method; * VII. Oct., The Mark Smith Method; * VIII. Nov., More about the Mark Smith Method; * IX. Dec., More about the Dr. Albert Method, and notes. 1908: X. Feb., More about the Mark Smith and the Dr. Albert Method; * XI. June, The Method of Guilio Danesi; * XII. July, The Boyce Machine; * XIII. Dec., Dr. Albert's Patent; * XIV., May, Piolunkowski's Patent; * XV. June, The Holt Etching Machine; * XVI. June, The Mark Smith Rotary Spray Etching Machine.

* Indicates illustrations.

The zinc machines are made in two sizes. The larger takes plate or plates up to 17 x 22 inches, and the smaller up to 16 x 12.

One of the first queries asked by, I should say, nine out of every ten people to whom I have shown machine, is, "Why is the paddle placed at one end of the trough, and how can it give an even spray whilst so placed?" The explanation is, that as the paddle revolves it picks up the etching solution from the well, and whilst the cavity at bottom of blade is quite full it has the furthest distance to throw the solution before reaching plate, the additional weight or pressure of the full cups giving it the necessary impetus. This pressure is, of course, reduced as the blade comes round and the cups empty, until when the shortest distance of throw is reached—*i.e.* that portion of plate immediately above the spindle—there is very little liquid left, and by this means the plates receive an even bite all over.

The motor is run at about 1700 revs. per minute, so that a full-sized plate will be sprayed from each of the numerous holes in each paddle, and thus will receive about 250,000 to 400,000 separate jets of solution per minute according to size of machine.

When the machine is set in motion the solution is sprayed with considerable force in the manner mentioned in the form of an extremely fine spray intermixed with air. The plate being face downward this force is continually washing away the oxide formed by the nitric attacking the zinc. Thus the mordant has always clean metal to attack, instead of as in the tub method wasting time and energy in first penetrating the film of oxide. You will all probably be familiar with another way of removing this oxide and quickening etching with the rockers by brushing, but unfortunately, unless done with extreme care this method is likely to spoil the work by causing the "side-spread" action to be greater than is necessary, and the result is that the high-lights are etched to a point before there is sufficient depth obtained.

I find many people unacquainted with machine etching disposed to query the evenness of such a plate, and in this respect I should like to quote an extract from Mr. Newton's recent lecture, when he clearly demonstrated that all etching machines etched more evenly than the tub method, and some very much more so than others.

Mr. Newton said:—"Microscopic examination shows that the metal is seldom attacked quite evenly by the acid, the shape of the cut not being symmetrical, but more sharply curved on one side than the other. This is probably due to the manner in which the acid strikes the plate; it is very perceptible in hand-rocked etched plates. At the same time, it also shows in all machine-etched plates."

It appears to me that over a given surface, however small, etched to a printing depth, there is bound to be variations in this depth when examined by the microscope; although they may be such that to the printer, and indeed all who may have to use the plate, it is so small that it would have absolutely no effect. To the man using plates etched on the Mark Smith machine commercially, they are more evenly etched than by the tub method.

I may say that in every case where I have had to investigate a complaint as to unevenness of etching, I have found that such has been due to either running motor too fast, or having too much solution in the well.

My own theory as to the causes of this is that if the machine is running too fast (more than 1750 per minute), the well is more or less emptied by each blade of the paddle, and that a great deal of the surplus solution left from the cavity at the end of paddle, instead of remaining at bottom, is whirled away from the next blade, and that too much air pressure is set up by the blades to allow the acid, after falling from the plate, to reach the well quickly enough to again fill the next blade, and consequently the contents of this partly filled cup are distributed unevenly over the plate.

In the same way, if too much acid is put into the well, some of it is splashed (not sprayed) up from the face of the paddle, above the perforated cup instead of through it, and this would also cause unevenness.

A peculiar feature of our machine is that when running, the temperature of the solution does not rise as is the case with the rocket tub and other etching machines.

Some careful tests have been carried out by Mr. Newton, who made up a 1 in 8 solution of acid and etched 1 square inch zinc, to 1 ounce of solution and on agitation obtained the following results:—

Rocking Tub.—

Started at	At end of 5 mins. temperature was	10 mins.	20 mins.
60° F.	70°	78°	74°
Mark Smith.—			
59°	67°	68°	65°
Levy.—			
68°	84°	85°	78°

So that at the end of ten minutes the temperature of the Mark Smith machine is only 68° as compared with tub 78° and Levy machine 85°.

This comparative evenness of temperature in the Mark Smith machine is probably due to the fact than when running the machine draws in cold air from the room through the two holes in side of trough which the spindle protrudes.

Now, whilst a hot solution will hasten slightly the etching of a zinc plate, I think it is generally admitted that it is somewhat dangerous as likely to soften and loosen the enamel, and for line work it is likely to cause the resist to run down sides of the lines and so cause undercutting.

One very important economic point is the great saving in acid used as compared with the ordinary tubs.

A careful record kept in several shops has shown that a saving of from 33 to 50 per cent. can be effected on the acid bill alone. This may not be such a great sum, but to a firm using a carboy of nitric acid a week it would mean a saving of something like £25 a year.

I think myself this saving of acid results from the greater care exercised in mixing the bath for machine etching. With the ordinary tub it is the custom in most shops to guess at the proportions of the mordant put into the different baths, and so long as this is near the correct amount of acid no harm seems to result. However, with the machine this "free and easy" method cannot be adopted, as where the plate cannot be watched all the time during the actual process of etching, an extra ounce or so in a given strength may result in spoiling the plate. This guessing method would be particularly dangerous when a man has once got used to his machine, as I find he is quickly able to size up the quantity of etching a given plate requires, as he knows the strength of his bath. There can be no doubt that this regularity and system must result in more uniform and better work all round.

In any case we have undoubted evidence that the Mark Smith etching machine does in practice reduce the acid bill.

After the plate has been prepared for the etch in the usual way, about 80 to 90 ounces only of solution is placed in well and the plate holder adjusted to take the plate or plates, which are put in machine face downwards.

In the case of line work the baths are made up in approximately the following strengths, although the strength varies considerably according to the fineness of work, quality of print, and many other governing factors.

Bath.	Water.	Acid.	Time.
1st	80 oz.	2 oz.	30 secs.
2nd	80 ,,	3 ,,	2 mins.
3rd	80 ,,	4 ,,	3½ ,,

And then heavy "four way" powdering, and etch as deeply as required.

I have found in all cases of machine etching that the "four way" Blooding process best protects the work and gives best results generally.

For line-work the machine gives very smooth surface at bottom of plate. It will etch the finest work without giving ragged "hairy" lines, and will etch them more deeply. An average 15 x 12-line plate can be etched full depth in from ten to twelve minutes actual etching time, and turned out complete in thirty to thirty-five minutes, and this without distressing the men, whilst the machine, unlike the human etcher, keeps up this rate of production and does not tire.

For larger quantities of line-work we also have a double machine. This has two troughs worked by one motor mounted on one base as before, and is fitted with friction clutches so that either bath may be run independently, or both together. In working this pattern machine, one bath is made up with a weaker solution for starting and finishing the plate, whilst the other contains a stronger mordant for the deep etching. This method has been found most economical in practice. One man minding bath can easily keep two men going powdering and burning-in the plates, and by this method very large batches of line-work can be turned out in a day.

In the case of coarse news half-tone plates, up to a 10 per cent. solution of acid may be safely used for a minute or one and a half minutes as the first bite for the plate, which can then be stopped out where necessary and etched for a further half-minute. This will give a sufficient depth to enable the foundry to obtain a good stereo. If preferred a 1 in 6 or 1 in 8 solution may be used and the plate given two and a half minutes to three minutes, which will give sufficient depth for even the stereotyper with the "deepest" ideas, and I understand from my friends of the "news" that this depth is most essential if they attempt to please the foundry department at all (and I believe many of them have given up all hope of ever being able to do this), although, as you know, however deep the plate may be etched, after a certain minimum the stereo flong will never be beaten or moulded absolutely to the bottom if it is intended to get the mould off again and cast from it.

For the finer screen work on zinc the time taken for etching is approximately from ninety seconds for 100-line screen work to thirty seconds for 200-line screen, the solution being about 5 per cent.

Another point I have often found when introducing this machine is that whilst willing to admit its value for coarse work, people are extremely dubious as to its utility for fine work. This is absolutely erroneous. I have seen some of the finest line-work produced over here etched most successfully and without losing a dot and still showing a big advantage as to time and quality of work as compared with tub-etching, it being particularly noted that the machine does not "round off" the sides and top of work near margins of plate and next large whites, as is the case with tub work.

It is also interesting to note that this fact often deceives people unaquainted with machine-work as to depth of the etch, and more than once I have had such a man argue that a certain plate is not as deep as, perhaps, the duplicate he has etched in the tub, and on one occasion only measurement convinced him of the error.

I well remember the first practical etcher to whom I showed the machine in 1905. He took a most gloomy outlook on the etcher's future, telling me that he thought we were trying to make etching absolutely mechanical, and that in a few years we should have lads, and perhaps girls, doing their work, and that the whole operation would consist of pressing the button and consulting a watch. Well, time has proven my friend to be a bad prophet, for it has taught us that more highly skilled men are wanted for machine etching than for the old method. In nearly every case that has come under my notice I have found that the most highly skilled worker in the shop has been put on to the machine. The friend whom I have quoted is now working a Mark Smith machine most successfully.

My advice to the etcher is—unlike Mr. Gamble's the other evening, who told him to be prepared to seek fresh woods and pastures new—to stick to his business and make himself as thoroughly acquainted with the principles underlying his work as possible.

("The Process Photogram.") July 1909

The Making of Originals.

Emile Laporte, of Fribourg, claims British patent for a process of making originals for photographic or photo-mechanical reproduction, about which he says:—

"The invention has for its object the production of pictures imitating in effect etchings of the best finish and without the intervention in any way of the talent of an engraver. The images are artistic, and consequently different from those which can be obtained through the intervention of photography.

"The process is realised in preparing, with the intervention of light, the plate or surface which is to receive the impression, this plate or surface being impressed or affected by a transparent sheet which bears the design itself executed in pencil or otherwise by the artist. But in order that one may design or depict on a surface it is necessary that this surface should not be smooth like glass, but it is, on the contrary, necessary that the surface should be grained as finely as possible, in order that the point of the pencil may leave a trace which is more or less accentuated according to the touch of the artist and the effect to be produced by the picture.

"The process consists in taking as a primitive surface a translucent sheet of which the surface is grained or roughened in order that the picture may be traced on its surface, and which after being thus rendered opaque has its transparency restored in order to permit of the passage therethrough of luminous rays.

"The supporting sheet which one may employ to realise this process may vary considerably. It suffices that it shall be capable of being grained so that the picture can be traced upon it and that its transparency can be afterwards restored to it.

"To this end the applicant employs by preference a sheet of polished celluloid of the clearest and most transparent kind obtainable. On that face, which is the most level and smooth, he forms a grain more or less close and fine according to the design which the artist wishes to depict and the effect which he desires to produce. A small close grain suits best for a highly finished design, whilst a larger and more separated grain may be chosen by preference for a mere study. The artist having before him this sheet, grained and rendered opaque, placed upon a white surface, or, better still, upon a transparent drawing-board lit from below, as, for example, the well-known retouching boards, can depict his design by hand, according to his inspiration, utilising if need be, as in the case of drawing paper, indiarubber or bread crumbs to efface certain parts, and can modify his design, soften details, and, in a word, produce on the opaque grained sheet the same effects which he can produce on ordinary drawing paper.

"This graining of the sheet of celluloid may be effected by different means. One way which gives good results consists in placing the sheet to be grained upon a plate of wood against which cylinders of Bessemer steel whose surfaces have been cut after the manner of files are rolled. These cylinders, receiving a to-and-fro movement directly or by displacing the plate of wood which serves as a support for the plate, press into the celluloid and form upon it a very irregular grain, the size and closeness of the grain depending upon the manner in which the surfaces of the cylinders are cut. Or the sheet of celluloid may be fixed at its four corners under the plate of a fly press and pressed against sheets of emery of different degrees of fineness so as to produce different graining effects. By giving several pressures by the plate of the press, the position of the sheet of emery being changed at each pressure, grainings quite irregular and different from one another may be obtained. In the case of plates of small size the grain may be produced on the celluloid by covering the latter with a sheet of emery paper or cloth and striking with a hammer sufficiently heavy and with a large striking surface. By suitably displacing the sheet of emery cloth at each stroke and with a little practice it is soon easy to produce the exact graining which one desires for the execution of a picture.

"Another efficacious method of obtaining a convenient graining on the surface of celluloid consists in sprinkling or spraying its surface with a solution of resin in alcohol. When the alcohol evaporates there remains on the celluloid a grained surface of fine particles which is very convenient for a highly finished picture.

"To thus fix the picture and at the same time restore transparency to the celluloid, one may, for example, dip the celluloid into a bath of acetone, alcohol, or other suitable liquid. Or one may cover the surface of the picture with acetone, alcohol, or the like by means of an aspirator so as to produce the necessary transparency.

"When the sheet of celluloid bearing thus the design of the artist has returned to its primitive transparency so as to allow of the passage of luminous rays, there is nothing more to be done but to place it in contact with the surface, which is to serve for printing the impression in printing ink or the like, and to treat it by any photographic or photo-mechanical process, using the drawing as an original negative or transparency."

✓ *Photography and Litho; can they give Photogravure Effect?*

Practical Pointers by an Experienced Spokesman. An abbreviated report of a lecture by Mr. J. Widdop at the Bolt Court School.

Good negatives from colored linoleum—Gum and gumption—Two varnishes—Where metal plates beat stones—An important suggestion—A rebuke—The offset press.

THE litho department of the great firm of De La Rue is entitled to, and possesses, the respect of all men of competent judgment, and it is well that Mr. Newton, the principal of the Bolt Court school of photo-engraving and litho, this session included Mr. J. Widdop, the practical head of that department, among his 1909 spring term lecturers. Mr. Widdop's experience has been varied and, it will be seen, bears the fruit of suggestion to younger craftsmen. He is a Yorkshireman; for which reason the editor of this journal may be excused for a kindly feeling for him, as one of the same county.

Neither has quite lived up to the alleged Yorkshire counsel to

> "Hear all, see all, say nowt;
> Eat all, drink all, pay nowt;
> And if thou does owt for nowt,
> Do't for thy sen."

They have come much nearer to the spirit of the Yorkshire toast "Here's to all on us; may we ne'er want nowt; noan on us. Nor me nowther."

Mr. Widdop spoke of experience in certain table cloth pattern work for a 30,000,000 run, worked in eight to twelve colors. Some of the work they used to draw, and one lot took thirteen weeks. He found a way of doing it in half a day. He photographed the colors, leaving black out. He also reproduced elaborate linoleum patterns. These often involved difficult color problems. The linoleum printer working with opaque colors could with impunity put any kind of light tint on top of any kind of dark tint. But that taxed the reproducer. In this trouble he first got the silver print and pressed it down on stone in the usual way. But he found one bright sunny day that by working at the right angle with a strong side light and getting a glint on the pattern he got a negative black and white, and from this he could get a fine transfer. He used ferrous oxalate developer. Nothing equalled it in clearness. Sometimes he had to reverse corners. A transfer of a corner B might not do for B, but it might do for corner C. For transfer he liked a writing bank post paper, coated with a very thin gelatine solution and afterwards with albumen. When you were going to use it you sensitised it on the back and pulled through the press. Using albumen one was not troubled with swelling. He used the 3 or 5 per cent. bichromate. Keep the solution off the front or the albumen would be dissolved. Use good transfer ink, thinning with turps to water consistency to fancy, rolling solid, and developing in cold water. The transfer would be as sharp as the negative. One could not get that result with any of the ordinary gelatine papers. The gelatine must be just thick enough to stick to the stone and sufficient to allow the ink to wash off clean. He used white of egg or sometimes dried albumen. He could not get the ground clean without this thin coating of gelatine. Another job was patterns of Lincrusta Walton. He worked with paper coated with gelatine, rolled up, transferred, obtained a fair amount of half-tone, and used photo-litho for successive colors; some fine specimens shown. Mr. Widdop showed a delicate pattern which some artist said could not be reproduced. In the original stuff as sold, the pattern was printed all over the surface and a buff then printed on top, which was easy in that manufacturing zinc process, but was difficult in reproduction on paper. His problem was how to get the pattern of that buff. He got the ground, pulled an impression from that ground, and made it up complete. He employed writing paper, not transfer—nothing that would come off. He dusted the sheet with dextrine, or with finely-powdered gum. One must not rub it, and must carefully note that the gum was dry. One had an impression in gum like a bronze impression. On running that down on a wet stone, once through, one had all that part gummed out. He proceeded to obtain a photolitho transfer, the gum having stopped out what he did not want. Nothing but gum would get over it. Mr. W. said he had not come across anyone yet that could tell him how this pattern was done. White should not be used if avoidable. To get varnish on a job like that he simply reversed the drawing, or transferred several colors together and reversed them, taking about twenty minutes. One needed two kinds of varnish—hard drying and soft drying copal varnish; the quick-drying was too quick. Mr. Widdop showed work varnished at night. Next morning it was fit to take away. Strong varnish or litho varnish would make the work sweat, and strong varnish would not give a glaze like copal. A specimen of carpet reproduction with a "fuzzy-muzzy" look, which improved it, was secured by a rough splash of grey lines being printed over light work. A facsimile copy of Baxter's "The day before marriage" by Mr. Widdop's screenless process was shown. Its eight colors cost not more than four pounds to carry through. Two subjects—an imitation of photogravure and silver print by M. W. process—were undistinguishable from a gravure or silver print. Mr. Widdop emphasised that the lithographer using aluminium and the offset process—availing, that was to say, of the resilient rubber blanket with its power of pressing in unequally—could secure that element of depth which gave charm and power to photogravure. Lithography had gone to the dogs more or less, but if masters would wake up and take hold of the offset press, they could make a great recovery of their trade. Mr. Widdop showed two color subjects in photogravure which he thought was the most beautiful thing ever printed. It was British work. The print was sold at 15s. a time; it was about 15 by 11 inches. He was proud that we had a firm in England which could produce such pictures. He had seen the original, and tones and chiaroscuro were all reproduced. What was wanted was the power of showing different degrees of intensity, and ordinary planographic printing could not do this, but it had been lately brought within the power of the lithographer.

Re etched tints, Mr. Widdop said that he believed a modification of the old etched tint method applied to aluminium and worked on the offset press would give results almost equal to photogravure, as the ink would print in different opacities as in collotype and graveurre, by first making a grained plate solid with grease as in the etched tint method, the developing a carbon print on this, and etching through it you would get a perfect half-tone on the aluminium by the etching through the different thicknesses of gelatine in the carbon print, as the specimens showed. This to my mind is a perfect half-tone photolithography, as the ink prints in different densities, which no other process does. Aluminium lends itself far superior to stone for printing half tones. I have seen aluminium plates printing all the tones like a collotype plate.

The photo print had an advantage over the ordinary litho or planograph. In the silver or the carbon print you had different depths; the several components were not all of the same strength. The old lithographers felt after this; they knew all about Fox Talbot's gauze for securing half-tones. They tried to get half-tone impressions in stone, and a lot of their efforts were still to be seen. Some of them were called etched tints. Some of the old workers grained the stone with a sharp fine grain, and rubbed it with wax or goose grease. The old polish lithographers were very fond of goose grease, and he believed there was nothing better. It was insoluble in water, which many greases were not. A pull from the grained stone gave a solid black, the ink being everywhere entangled. For half-tones and high-lights they rubbed down with a cuttle-bone. Thus different intensities were secured. They found, though, that the stone when lightened thus would fill up again. That did not apply to aluminium; if once got right it could be kept right without trouble. By this etching and rubbing down one got in this litho or planographic printing what was practically photogravure, *i.e.* one got a print in different degrees of intensities. There was a pointer for any who wanted to experiment in half-tone work. The aluminium plates must be right at the start, no doubt; if they were not they could not get them right. At least he never could. Let them try this rubbing down process with aluminium, and if they could get someone to take up vigorously the working of this method with the help of the offset press, it would be a good thing.

Answering various questions Mr. Widdop said they would grease over the aluminium plate just the same as the stone. Get an aluminium plate with sharp edge; warm the plate before a fire and rub in beeswax. Why some Polish printers used goose grease was because it was insoluble in water, which a lot of our greases were not. It was all rubbed down with a piece of flannel, and a smooth surface resulted, with tips of aluminium showing. All below was solid ink. When the plate was etched with strong nitric acid the unprotected parts were etched to rottenness and more rottenness. It was not photogravure, but none the less where they had a dense part in the negative it took ink scarcely at all and the light part took ink strongly. Where there was a lot of gelatine on the aluminium plate that gelatine minimised the action of the acid and the plate would keep its local blackness. This way of working was only in the experimental stage. Re-transferring might want a very skilful man. He had thought of that. There were always a lot of objections possible to anything. When Frey came to England from Zurich, he knew him well. He was not taken up by right people. If the masters had taken this process up strongly there would have been great benefit for many. Questioned again as to re-transferring, Mr. Widdop repeated that he believed re-transferring was practicable. He would like to stake his life that he could do it.

Why should not silk and soft textiles and thin paper and things not practicable for letterpress machines be printed in this way? He showed at this point a small 2½ × 1½ motor car printed on very rough paper, and won Mr. Newton's assent that it could not be done so well letterpress, under these conditions. As to the offset presses, the only thing he saw to redeem litho was the offset press. It should especially bring color work back. Let them interest their employers in it, though that was hard. (A voice: "Very, very hard!")

Answering a question on depth of color, Mr. Widdop said whether by his method they could get depth of color depended on the paper and the mixing of the ink. He thought full depth equal to letterpress should be got. Stiff ink was wanted. As to screens, he declared that he had all his life fought shy of them, except that in his younger days, before he could buy screens, he made them himself, but he always used screenless processes now.

To another questioner he said aluminium was better than stone in some ways. After nine years' experience of aluminium rotaries, he swore by aluminium. A little soap dissolved and rubbed on the stone, and the stone was spoilt for ever; but you could wash an aluminium plate with the same stuff all day and it would not hurt it. But if a weak transfer was on aluminium, you could not make it right; but if it had been put on right you could not spoil it with ordinary care. If you got it in half-tone it would stop in half-tone. Zinc went wrong quicker than aluminium. You could run 250,000 or 500,000 from a metal plate and not lose a dot, provided your paper and printer was right. Water would often spoil work on stone, and where there is only a few dots of work in such cases as, say, a 60 x 40 sheet. This did not occur with aluminium. A 60 x 20 poster was drawn and printed and hung up in sixteen colors in two hours in my presence. 200 could be done in one day far better than any litho work.

The specimens shown in illustration of the many points were a truly magnificent lot, and seemed to indicate that lithography, in competent hands, has little to fear from three-color letterpress; but that it would hold its own by dint of keeping up its old qualities, with modern economies and improved speed of production.

An Immediate Antidote for Escaped Acids.

By Dr. H. Bodenheim.

FROM personal observation in a Denver newspaper office, on a recent trip in that section, it was forcibly brought to my attention, by seeing two men killed from the fumes of nitric acid, that our craft should be enlightened on the subject of prompt protection to the lives of their workmen, and also the necessity of educating those handling acids that they may better protect themselves.

This is not only as important as to protect yourselves against fire, but, to my mind, it is the imperative duty of every photo-engraving establishment to use every possible means to prevent loss of life or disability by the use of acids. Hoping to aid my friends in this regard I will say that if they will get a barrel of Guilder's whiting at any local paint house, which costs but $1.50 or $2.00, they will do much to prevent accidents by fumes of acid in case of the breaking of the carboy.

Bicarbonate of soda, sand, or lye are not the proper materials to use. Whiting will absorb and neutralise the acids quicker and better than any other chemical.

Some of my friends may have been unfortunate enough to have a carboy break, and they will know exactly what that meant.

Nitric and sulphuric acid are more dangerous than muriatic acid (hydrochloric), but any of them makes you enough trouble, in case of accident, so you should try my suggestion and get the whiting.

Guilder's whiting is very simple to apply when a carboy breaks. Put enough of it over the acid until the acid is all absorbed. The combination will form a dough-like mass which can afterwards be removed by use of water.—*I.A.P.E. Bulletin.*

Engraving Terms Defined.

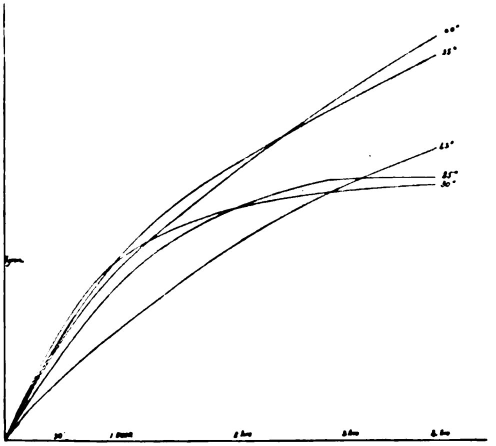
ENGRAVER. — A patient animal, highly trained. Sometimes has a little sense. *Customer.*—Combination of the common species of bulldozer with an uncommon species of philanthropist. Easily known by his superior knowledge of the engraving business. *Competitor.*—A rascal and a sneak. Not very much is really known about him. Said to have horns and a tail. Generally perniciously active between the hours of 8 p.m. and 8 a.m. *Money.*—We know very little of this term. From passing glances at samples we should say that in our opinion dollars are larger than half-dollars and considerably harder (to get). — *Bulletin of the International Association of Process Engravers.*

("The Process Photogram.") July 1909

Elementary Research at the L.C.C. School, Bolt Court.

Some line-diagrams reproduced from the report of the Bolt Court School may interest our readers, as showing the sort of simple but original work that is given to some of the day scholars, when they have been grounded in the technique of process-work. Such research may not be of any great use to the man who is to be an etcher or a negative-maker all his life, though even he must be somewhat the better for the stimulus to thought, and for the lessons in accuracy in weighing, measuring, timing, taking temperature, etc. The first set of curves shows the relative amounts of copper dissolved under standard conditions, by various strengths of iron perchloride solution, in various times.

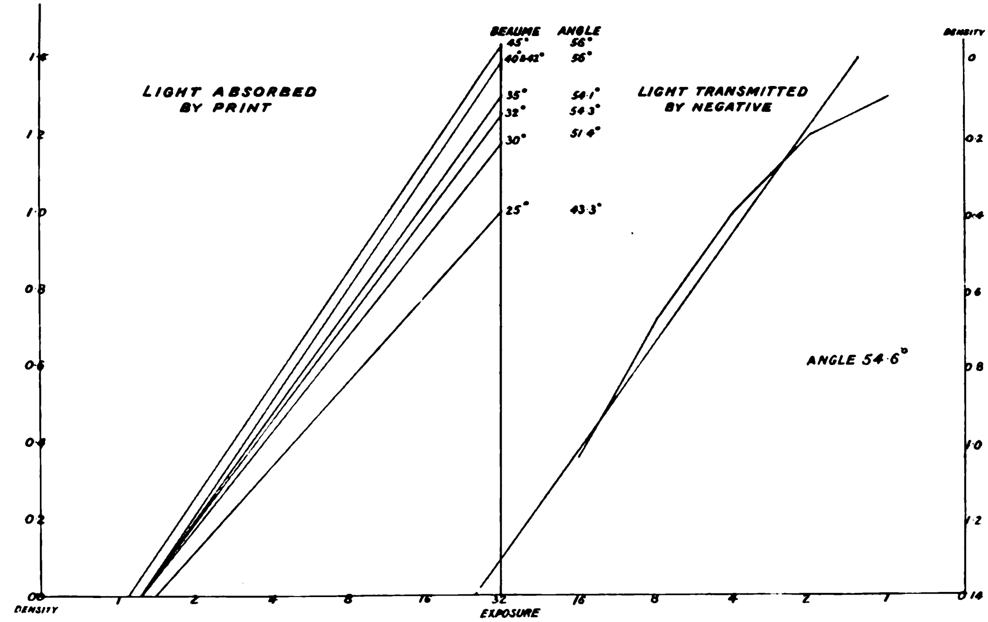
The method of undertaking the research was first of all to prepare a solution of pure iron perchloride in water, of known strength, at a temperature of 60° F., then a small piece of copper was carefully weighed to three points of decimals, and placed in a given quantity of the solution. After the lapse of a certain time the copper was removed and weighed again and the loss noted. This was repeated from one minute to ten hours in various solutions, and the curves show the results. One example may be given. 25 c.c. of solution of 35° Beaumé perchloride was prepared. This had placed in it a piece of copper weighing 8·802 grammes. After ten minutes it was re-weighed, and was found to be 8·592 grammes, the loss being ·21.



Weight of copper dissolved in given times by perchloride of iron solution in various strengths.

The second diagram shows the effect of various strengths of perchloride solution upon the steepness of gradation (the "pluck" or the "flatness") of a half-tone plate. A screen negative was made by pinning up a piece of blotting-paper on the copyboard and exposing for a certain time, then covering a small portion with black velvet, then exposing for twice the first time, then covering that portion, exposing again twice as long, and so on, until there were a series of geometrical exposures. The resulting negative was then printed on to metal, the metal cut into strips and etched in the different solutions. Prints were then taken from the etchings; both the negative and the prints were measured in the spectrophotometer, and the curves shown give the results.

The behaviour of the curve of the 45° solution, in the first figure, so different from the action of the rest of the series, seems to suggest possible error. If this one line is eliminated we see that the 40°



Measurement of densities of a negative of graded strips, and of light absorbed by prints made from copper relief etchings from that negative in baths of varying strengths. Showing the effect of the etch upon the vigor of the print.

strength etches most regularly and persistently through a long period; and it also gives the greatest amount of pluck and gradation. Further, that by reducing the strength to 25° we can reduce the pluck and contrast very materially.

✓ *Trichromy Without Moiré Effect by Using the Schultze Screen, 60°.*

By F. Dogilbert, in "Le Procédé."

THE parallel that we propose to show between the ordinary cross-lined screen and the Schultze screen at 60° takes into account by the use of the latter new results which we have elsewhere practically tested.

Fig. 1 represents the smallest group of elements of the screen image encircling one of these elements; we will call this, for convenience in explanation, a positive system; under the same conditions we will consider fig. 2 as representing a negative system. Figs. 4 and 5 show us the arrangement of dots obtained by superposing the three screens inclined about 30° over each other, and rotating them around an axis either of a positive or negative system.

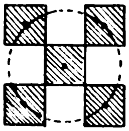


FIG. 1.

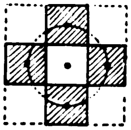


FIG. 2.

The normal use of three colors in polychrome printing demands a division of the circle into three or multiples of three for the respective positions of the different screens. The Schultze screen seems, by rights, best able to accommodate itself to this condition, since the image it gives, when used normally, has its dots in straight lines following three directions at 60°.

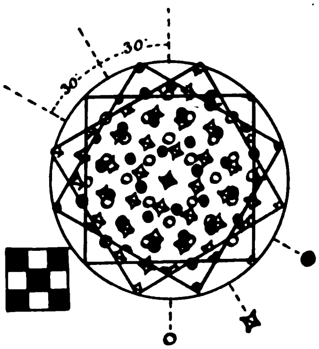


Fig. 3.

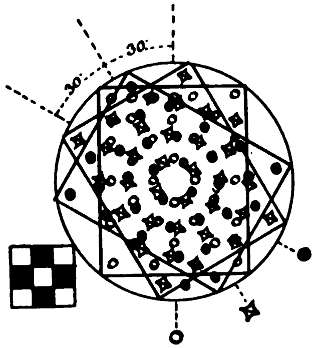


Fig. 4.

If we consider as before a positive system of elements (fig. 5) and a negative one (fig. 6), we notice that the rays which join the centre of rotation to the centres of the elements are equal in both systems, while they are unequal in the case of the ordinary cross-lined screen. If we should superpose three blocks made by means of the Schultze screen after successive rotations of 60° around the centre of an element either positive or negative, all the elements would be superposed three by three, which would be an eminently defective arrangement; the proper and ideal distribution of colors should be made by juxtaposition and not by superposition, the first arrangement always giving, by reason of the faint transparency of the pigments used, a duller tone than the second, which only combines the sensations transmitted separately by each color. If we make successive rotations by moving to a sufficient extent the centres of rotation of each screen, we obtain the arrangement of dots shown in fig. 7, in which the three centres are placed in evidence in the interior of a small common circle, and the movements by the overlapping of the three arbitrary circles which we have selected from each screen. Such an accentuation should be regulated once for all in the case of a circular screen, but should be worked out for each operation in the case of a rectangular screen; this being more practical and economical to use, we show below by means of movements which are most easily applicable to this case.

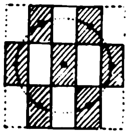


Fig. 5.

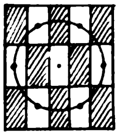


Fig. 6.

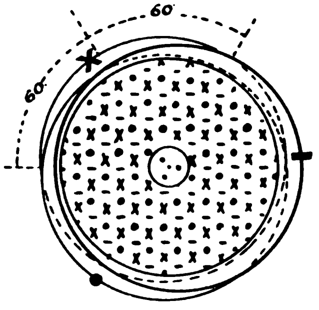


Fig. 7.

The importance of this shifting should,

however, be again insisted upon as shown in fig. 8, which groups in one part the three impressions obtained respectively by rotations in the indicated orientations with a special diaphragm, and in A shows the effect of the superposition of the three by three, while in B, thanks to the shifting, they are in juxtaposition.

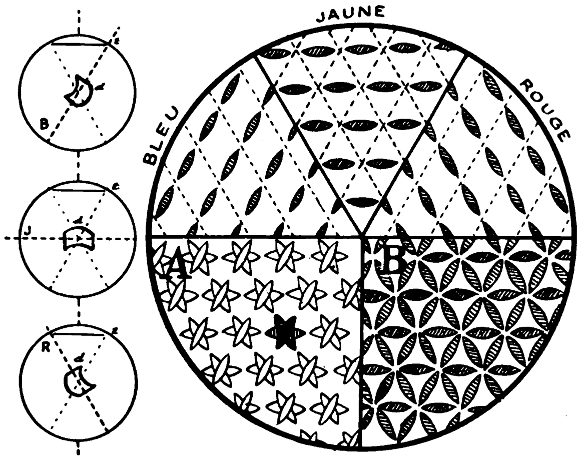


FIG. 8.

We see by fig. 9 that it would be sufficient if we employ a vertical shift of equal amplitude for each of the screens in thirds of the distance which in one or other of the screens separates two such points as *a* and *a'*. Fig. 10 shows the distribution of dots resulting from this shifting. The use of such an arrangement jointly with the elongation of the dots of each screen image following a predominant direction would unhappily cause the vertical parasitic lines we are to consider in a certain measure as appearing to form a moiré pattern; this inconvenience can be avoided by using proper diaphragms and, when needed, by a very slight transverse shift made at the time of printing without any injury to the register, the extent of this shift being much less than the admissible error of register of the different formes, these different means permitting the distribution of the dots similar to that shown in fig. 11.

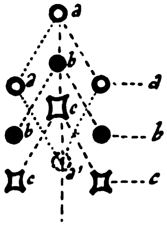


FIG. 9.

We can also entirely abstain from all shifting of the screen during the negative-making for each monochrome on condition of doing this shift during the printing under the conditions indicated in fig. 12. To give some idea of the smallness of this shifting let us point out that for a screen having sixty lines to the centimetre each of these shifts, vertical and horizontal, is less than one-tenth of a millimetre.

Fig. 13 shows one above another different shapes of dots obtained with the Schultze screen and using corresponding diaphragms; finally the last line shows the collection of dots resulting from these arrangements in the finished tri-color image. The profiles of diaphragms *a* to *g* are the result of exact geometric calculations, and have nothing fanciful, although appearing so; the elongation of the dots

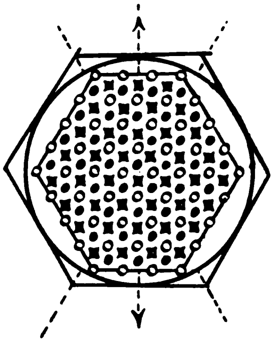


FIG. 10.

following the predominant lines without affecting the result. The shapes

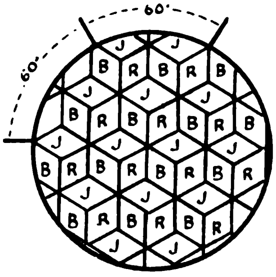


FIG. 11.

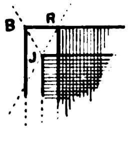


FIG. 12.

presented by the inventor of the 60° screen, without being useless, do not fully satisfy the demands of three-color work.

The three shapes *a*, *a'* and *a''* of diaphragms giving the same shape of dot yield the ideal distribution of the three colors shown in A; the shapes *b* to *e* give elongated dots which do not give the moiré by rotations at 60°; shapes *f* and *g* are the most advantageous, as they elongate the dots in the direction of one of the lines of the screen, but we have also obtained excellent results with shapes *d* and *e*.

To sum up, there is nothing to prevent using 60° screens for three-color printing, the advantages of using them, besides the qualities belonging to these screens, being the absolute suppression of moiré and the possibility of working the whole set with a single screen, usable also for work in black, by simple rotation of the diaphragm and imperceptible shift of the forme during the printing.

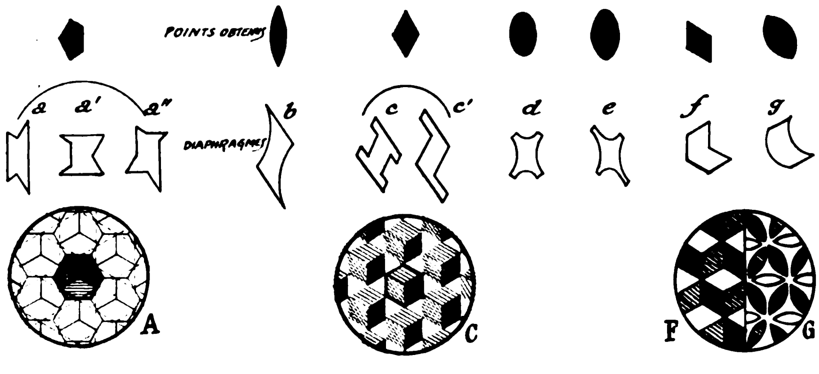


FIG. 13.

Running Down the other Fellow.

A TENDENCY which we see in a number of the advertisements and circulars that come to our desk makes us feel that it is time to ask our readers to consider carefully a little question, which we put thus:

Is it wise to belittle our own trade?

A very old proverb says, "It is an ill bird that fouls its own nest," and we think that it is a great mistake for photo-engravers to spend their time and talent in suggesting that other photo-engravers are incompetent or fraudulent. From a well written advertisement that is being largely distributed we quote the following:—"A certain busy man continues to give out orders for cuts to Mr. Smith, because Smith has always done 'em.

Looks to us as if that were a good reason for changing engravers, for won't the man who has always done 'em do 'em again? Why not *try* another?" Of course, a firm is quite right in attempting to show that it does excellent work at reasonable prices, but we think it would be for the good of the trade as a whole if it did not suggest that another man was doing less excellent work at less reasonable prices. Every firm realises that what it wants for itself are regular customers who will send their work steadily year in year out, and who will get good attention because the whole staff knows their particular requirements, and because their work comes regularly. We think that every firm would admit, if asked the question calmly and seriously, that one of the worst things possible for both the engraver and customer is a frequent transference of accounts. Therefore it looks like short-sighted policy to spend great effort in persuading people of the advantage of change.

Another advertisement reads as follows: —"Take time to tell us the trouble. Were you disappointed to find your illustrations looking dull and flat, with poor values and a lack of contrast? Send us the same photograph and we will show you what a difference skilled workmanship will make in a cut."

We are reminded of the parson's little boy who said to his father, "Is it true, dad, or only preaching?" and we realise that most people read advertisements with a feeling that they may expect exaggeration and statements that are not intended to be accepted as literally true, or as involving all their apparent logical consequences. If advertising were to be taken as truthfully and logically intended, the announcement quoted above would be equivalent to a suggestion that every firm competing with the advertiser was a firm supplying dull, flat illustrations with poor values and lack of contrast. This would mean (since the advertiser is but one and the competing firms are many) that a majority of the firms in the photo-engraving trade were turning out dull, flat, poor work. This sort of suggestion is quite unhealthy.

Another announcement which reached us recently reads:—"When you are tired of getting bad work from others, try ——." This, again, reads as a bald wild charge to the effect that most photo-engravers are sending out bad work. We are not sure that it would not be taken by many customers of good feeling and good taste as a suggestion that the advertiser himself was a man to be avoided rather than patronised.

This question was considered recently in an article in *The Master Printer* under the heading of "Competition *v.* Courtesy," from which we extract a few paragraphs:—

"That there will always be a competition of adaptability and desirability we are ready to admit, but that there should be a competition that makes fellow tradesmen in the same line become such bitter enemies that they will malign their competitor and misrepresent the goods he sells in order to make a sale, and that at a cut price, we deny.

"So far has this system of trade war gone that there are but few crafts or professions that have not been compelled to organise into associations and boards of trade for mutual protection, not against the buying public, as many suppose, but against each other. Just stop and consider this point for a minute. It is not your customer that makes your prices unprofitable; he pays just as much as you ask him to pay. He may bargain and dicker with you to get you down to a lower price; but you generally hold your own until he tells you that he has a lower price from your competitor. Now is not this so in most cases?

"You of course blame your competitor and call him all sorts of names. But stop a minute and consider. How did the customer come to be a shopper and always ready to play one competitor against another? Was it not because you and your fellows asked him to do this very thing?

"Do you ever stop to consider that if the business you are in is ever to have a future that will command for its devotees a place in the commercial world it must be conducted on lines of broad-minded liberality and a courtesy that will protect the unwritten ethics of the profession as thoroughly as it will obey the rules that have a penalty attached? There was a time in the business of the world when 'honesty is the best policy' was taught as a maxim. To-day you will find the maxim to read, 'honesty is a necessary part of the outfit of any business that is to be permanently successful.' And upon careful investigation you will find that this honesty must extend all through dealings, even those with its competitors.

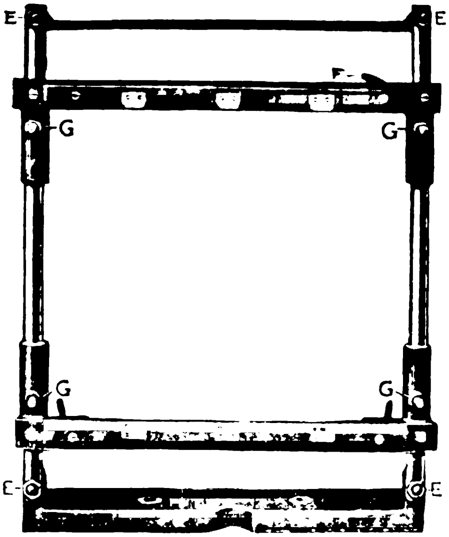
"Competition that is not conducted along the lines of honesty to all and courtesy to your competitors will result in business death—not life."

The Arc Gear Camera.

Hunters' Arc Gear Camera, of which we gave an illustrated description a twelve-month ago, has been the subject of continuous improvement, and all the improvements are gathered together in the new pattern which is just ready for the market. The principal special features, of course, remain; including the easily-detachable bellows, the very efficient and durable patent bearings for the base of the camera and also for the screen-frame, and the powerful, positive, yet easily and delicately adjustable micrometer screen-setting arrangement.

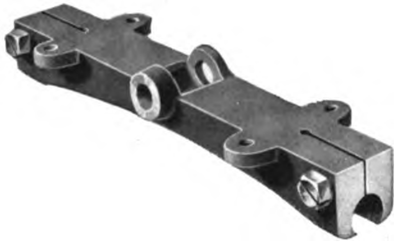
In the new pattern the back has an instantly-changeable arrangement for taking a square and a circular cross-line screen, a feature that will be much appreciated with the growing use of trichromy.

All woodwork has been removed from the screen-frame, which in the earlier pattern was of metal faced with wood. Now the metal is left bare, the uprights



Iron screen frame with aluminium sticks.

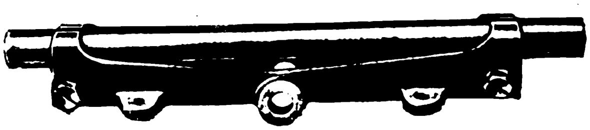
are steel rods of ¾-inch circular section, every corner of the screen-frame is separately adjustable, and the whole arrangement is believed to be the strongest and most stable yet put into any camera.



Split bearing of iron on which camera body is mounted.

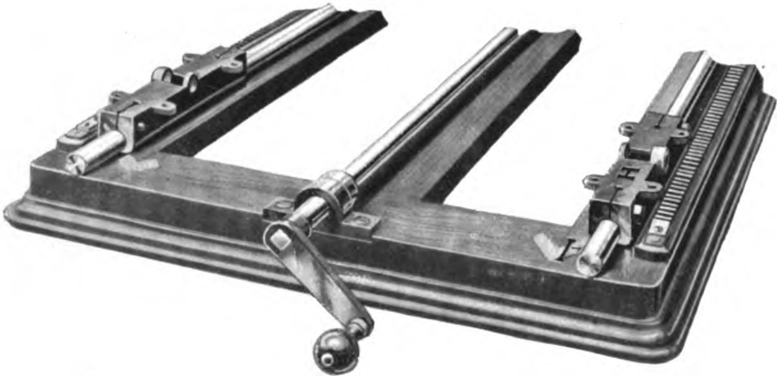
The rotary screen-gear and its mount are all in aluminium.

Amongst the minor—but not by any means unimportant—details is the improved safety-catch arrangement for working the adjustable screen-holding bar. With the old rack-work arrangement, although it was very efficient, it was sometimes found that while one tooth of the rack left the screen slightly slack the catch could not be moved to the next tooth without making it too tight. By the new catch the adjustable bar can be fixed absolutely anywhere, so that any size of screen can be held just firmly. Yet the catch can be released with one finger.

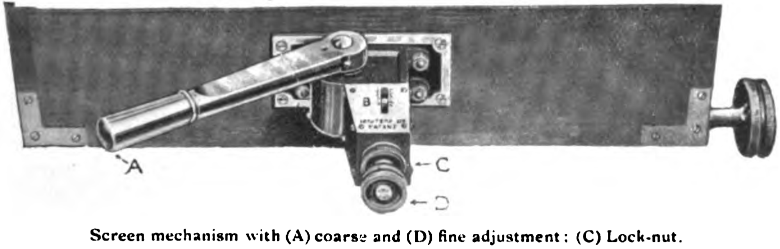


Split bearing *reversed* to illustrate how it encloses the steel rod.

The illustrations, which show some of the features of the new camera, are taken from a descriptive circular that can be

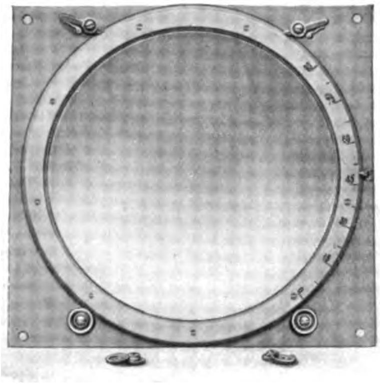


Portion of baseboard, showing the split bearings in position enclosing the steel rods.



Screen mechanism with (A) coarse and (D) fine adjustment; (C) Lock-nut.

obtained from the manufacturers—Hunters, Ltd., Poppin's Court, London, E.C., and that is sure to prove of much interest to all users of process cameras.



Rotary screen holder for color work, instantly detachable.

Business.

JUERGENS BROTHERS have removed to 167 Adams Street, Chicago.

THE ALABAMA ENGRAVING COMPANY has been formed to open a business in Birmingham, Ala., as soon as it can find a site.

THE ACME ENGRAVING COMPANY, New York, capital $3000, has been incorporated in New York by Sewall E. Moody, Richard V. Schulter, and Walter J. Sullivan.

THE MÜLLER - BLICKHAHN ENGRAVING COMPANY has been incorporated in Chicago with a capital of $10,000 by Henry Blickhahn. Hubert P. Blickhahn, and Henry A. Müller.

THE FORT WAYNE ENGRAVING COMPANY, Fort Wayne, Ind., has been reorganised with Mr. B. J. Griswold as president, and has moved to new premises in the John H. Bass building.

THE SUFFOLK ENGRAVING AND ELECTROTYPING Co., which has just removed to much larger premises, is one of the oldest and most successful process houses in the States. Starting in 1876 with only a handful of men, it has passed through all the various stages of development, including consolidation with, absorption and purchase of, many competitors, until now its organisation is comprised of the brain and sinew of what were once fifteen separate concerns, the latest acquisition being that of the James S. Conant Company, which has enjoyed a reputation for the unusual excellence of its engravings of mechanical subjects for over thirty years.

Three large plants are operated, one each in Boston, New York, and Providence, R.I., with a force of salesmen covering the New England States and New York, with occasional trips beyond these limits.

The field of operations of the Suffolk Company is not confined, however, to the territory in which it finds itself situated, its trade extending to every quarter of the globe.

For a number of years the Boston plant has occupied four floors in a large building at 234-236 Congress Street, but now finding these quarters inadequate to its needs, has moved its entire plant to the Atlantic Building at 394-396 Atlantic Avenue, where it will occupy two of the mammoth floors with a specially constructed photographic department on the roof.

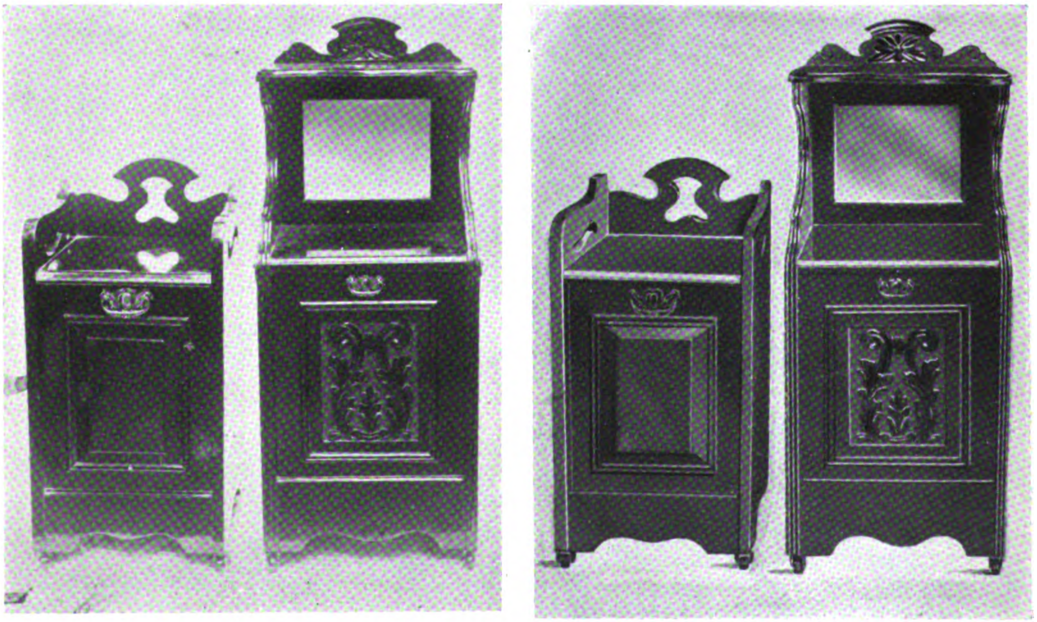
Many years of experience have been productive of the best arranged photo-engraving establishments to be found. Economy of operation and labor has been sought for in the arrangement of the plant, and has been accomplished to such an extent that many exasperating delays coincident with poorly arranged plants are entirely eliminated. One detail of equipment which will readily commend itself to the publisher of catalogues is the introduction of a north exposure studio light in connection with the dry plate and color photographic department.

Any of our readers who may be visiting Boston and who care to see the up-to-date equipment will be welcomed.

School Notes.

PREPARATION OF ORIGINALS AT BOLT COURT. —There are few, if any, process houses nowadays that do not fully appreciate the influence which the carefully retouched original has upon the reproduction. Where it does not entirely dispense with fine etching, it at least reduces its necessity to a very considerable extent. Indeed the only vulnerable point to be found in its practice is due to the use of unsuitable pigments. It frequently happens that beautifully finished drawings give unsatisfactory copies from this cause alone, and one of the chief aims of the class at Bolt Court is to afford instruction in the treatment of all kinds of originals, with the view of obtaining the most perfect and uniform results. Like all other branches of art it must be taken seriously, and success comes only to those students who realise this and are prepared to devote whole-hearted study to it. The instructor, Mr. Frank W. Brookman, takes a great interest in his work and a pride in the individual progress of his students. The research department of the school has given much attention to the selection of pigments for working-up, especially to "whites," and the results of experiments have been illustrated in our pages from time to time.

The Process and Litho Classes of the Liverpool Central Technical School have just issued a very interesting souvenir of students' work. Perhaps the best item in the whole is the cover with good line-block designs on both front and back, but with the name of the school in a type that rather overpowers the front cover design. The examples in the souvenir include photo-chromozincography, fine line zinco, half-tone, Sear's high-light litho process with metzograph screen, "Iris lithography," in which a series of colors are blended into one another in stripes across the print, and are all done at one printing, collotype, high-light half-tone litho, photo-chromolitho, amphitypy, chromo-lithography, and photo-chromo-aluminography. While it is perhaps a little invidious to criticise students' work, one may be allowed to say frankly that with a little more care in the printing and production, this souvenir might have been made a better representation of work which is really very good. The choice of inks and paper is not always the best possible, and there are evidences of hurry, as, for instance, where the ink from one of the prints has offset considerably on to the back of the print before it. The usefulness of the souvenir would be increased if it had a few notes upon the examples. This we feel with many specimen books, but especially with one that is so varied and interesting in its appeal as the Liverpool Souvenir. It would be interesting, for instance, to know why the line block of "Poor Joe" from Dickens is printed on fabric. Doubtless there is a good reason for this, but it is not obvious. Mr. Joseph Goodman, who is the responsible instructor in



The Preparation-of-originals class at Bolt Court is proving increasingly attractive to students. The prints above show a subject before and after treatment by one of the pupils.

all the process represented, is to be congratulated not only upon his own versatility but also upon the success of his students in working under his instructions.

"Tips" and "Wrinkles."

Payment is offered for brief practical notes and suggestions,—just those thousand-and-one little things that go to make work easier or more successful or more profitable.

Five shillings will be paid, on publication, for the most useful "tip" contributed in any month; and other payments of 5s., 2s. 6d., 2s., and 1s. are offered.

Every "tip" accepted will be paid for, and the payment will be governed by the apparent usefulness, *not* by the length. Three lines may be better than thirty.

Rules.—Write on one side of paper only. Each "tip" on a separate sheet or sheets, with the name and address of the sender, which will be published or not, as desired. Address to "Tips," c/o the Editor, *The Process Monthly*, 6 Farringdon Avenue, London, E.C.

REPRODUCING ORIGINALS IN COLORS.—Mr. Stephen H. Horgan, in *The Inland Printer*, says that the following is the best method of dealing with such subjects when the black is an important part of the design:—"Let us illustrate this problem by photographing the Belgian flag, which consists of three vertical stripes of black, yellow and red. We can get a record of the black by using a panchromatic, or red, sensitive plate. We cannot however get a record of the yellow or the red without also getting the black. Now, the solution is this: Make a contact positive from the black-record negative; put this contact positive up in absolute register with the red-record negative and make a positive from both; from this positive make a negative and you have a record of the red with the black eliminated. Repeat this process with the blue and yellow record negatives and you thus secure negatives of the black, yellow, and blue. It is customary here, in a case of this kind, to make color-record negatives as usual. Put all three of these negatives up in register and make a positive, which is, of course, a record of the black, shown as density. From this a negative is made as a record of the black. A black printing-plate is made from this, and all three color-plates also carry the black. Should the color-plates print out of register, the black plate sharpens it all up, so that the lack of register is not so much in evidence."

TO MAKE A DEFINITE IMPRESSION.—Most of the packed goods that come in parcels from good business houses have labels and wrappers that are evidently carefully designed to create an impression in regard to the quality of the contents of the parcels. The engraver wishes to create the impression that

(*a*) his engravings are produced with great care;
(*b*) his business is well organised;
(*c*) he would gladly replace unsatisfactory work;
(*d*) he is interested in pleasing each individual customer.

I suggest that a good deal can be done toward creating such impression by using a well designed, well printed label in something like the following form:—

WITH GREAT CARE.

CONTENTS:—Fine printing-plates. Please unpack with care, and store in such way that the faces may not be damaged. A leaflet of hints on storing and preserving blocks will be sent on request.

If any fault is found which may have arisen from inexpert packing, please quote No......

To

Per *Date*

From THE BIGBEST ENGRAVING CO.,
20 Swanpool Avenue, Bannockburn.

I think that such a label, regularly used, would have a good effect upon all persons frequently handling the parcels. The leaflet which it offers is already sent out by some firms.
—HERBERT J. LIVINGSTONE.

CARPET REPRODUCTIONS.—Some very rich and wonderful reproductions of carpets have been attracting the attention of printers and reproducers lately, and there is a certain amount of mystery about them, as the process is a guarded secret. The prints are marvellously rich, and have a heavy, deep carpet "pile" that adds enormously to the naturalness of their look and feel. Their cheapness is one of the important points, for quite complicated prints in 12 x 10 size are being produced at 1s. or 1s. 6d. each in very small quantities (dozens, not hundreds). They are coming from Germany and Holland, but some of the best and earliest were produced in Manchester by Messrs Norbury & Natzio, of Old Trafford; and at least one other Manchester firm is doing excellent work in the same line. The key to the process is a special "flock" paper of creamy tone, with a wire-wove backing and a pile surface that varies in thickness in different qualities. This is supplied in rolls of 30 feet × 40 inches by most paper-makers, including John Dickinson & Sons, Spalding & Hodge, and Grosvenor, Charter & Co, at prices from 10s. to 15s. a roll, according to quality. The printing is done by both letterpress and litho methods, the endeavor being to carry a large quantity of a very fluid dye-ink to stain the pile deeply, and yet to avoid too much side-spread. A certain amount of spread rather helps the effect, if the register is good, by giving slightly softened edges to the colors. The lithographic method is advocated because it avoids the crushing of the pile that is necessary to get a firm impression at letterpress.

The method should give a real impetus to photo-mechanical methods of sampling and advertising such "pile" subjects as carpets, curtains, tablecloths, shawls, etc., and it offers a great field for costume illustration by the printing of velvets, furs, etc., which may be cut out and mounted "appliqué" upon designs showing the rest of the subject and surroundings treated on ordinary paper by letterpress or litho. In catalogues of house-furnishing, real pile reproductions of carpets and curtains can be introduced with telling effect.

At Shepherd's Bush, the Imperial International Exhibition, there are good displays of process work by André & Sleigh, John Swain & Sons, Ltd., and Carl Hentschel, Ltd. Of course, they all specialise on trichromy, and some very fine work indeed is shown. The Swain display is the largest; the Hentschel exhibit includes many recent books from various publishers, illustrated in Colortype.

Price Lists, "Ads.," and Specimens.

Air ships and aeroplanes are used by the Franklin Engraving Company in a very striking recent advertisement of their work as designers, engravers, etc., and at the foot of the drawing they introduce in silhouette the kites which were used by Franklin, from whom they take their name, to draw electricity down from the clouds.

From Georgetown, Demerara, we fairly frequently receive good examples of process work and printing from the executors of C. K. Jardine, Decd. The latest to hand is a calendar decorated in three-color half-tone, a very good piece of work.

"The Reason Why" is a bright, alert newspaper for advertisers, published by Burke & Weston, Challis House, Sydney, N.S.W. The Burke in question is Mr. Walter Burke, well known as a photographer and journalist, and he is to be congratulated on his connection with a business and a journal that seem full of usefulness to advertisers. The "B. & W." ad-writing and the "B. & W." designs are alike telling and attractive.

Brevities.

Spontaneous combustion of chemicals is the cause given for a fire on the premises of the Wrigley Engraving Company, Atlanta, Ga.

Daylight saving is being well pushed to the front in Canada, and is being taken up by the statesmen, largely at the instigation (it is said) of certain printing concerns.

The duty on printing plates entering the United States is scheduled for an increase of 5 per cent. (from 20 per cent. to 25 per cent. ad val.) by the Committee of the Senate.

Oscar Binner has left process work to found Luther Burbank's Products Inc. Burbank is, as most folk know, a producer of new varieties of commercially valuable vegetables, fruits and flowers.

The Bureau of Engraving, Washington, D.C., is attempting to stamp out the gambling habit amongst its 4000 employés, and has already dismissed one man who was found to be book-making.

The Program of the I.A.P.E. Convention includes papers on "Science and Money in Photo-engraving" by N. S. Amstutz; "Focussing, Old and New," by Arthur Fruwirth; "Design and Color," by Will Bradley; and "The Photo-engraver and Printer from a Business Point of View," by J. Clyde Oswald.

The I.A.P.E. meets at the Hotel Kaatershill, in the Catskill Mountains, on the 6th, 7th, and 8th of this month, and should have far the largest gathering yet seen in connection with the Association.

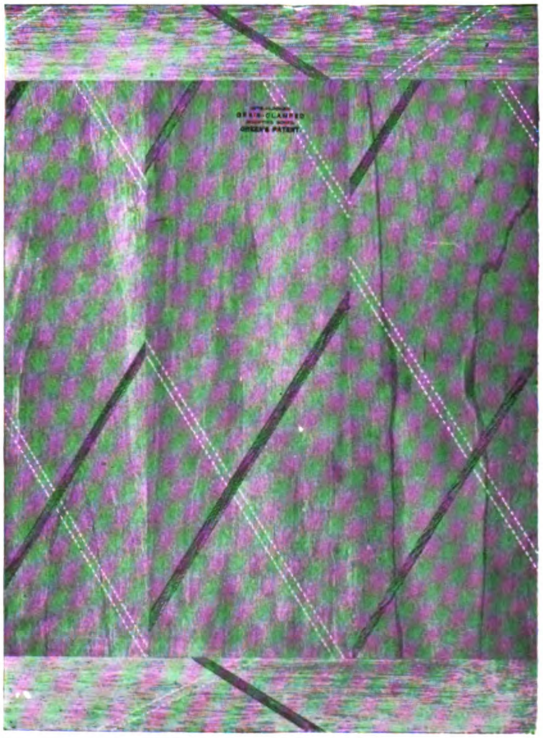
Proofs of 250 Dalziel woodcuts have been presented to the Hampstead Central Library, Finchley Road, N., by Mr. Gilbert Dalziel. Many of us who are now burning old illustrated journals or using them to line pantry shelves may live to see their woodcut illustrations collected with enthusiasm and running to fancy prices. A collection of the best color-prints produced in these early days of trichromy—especially if dated—is also likely to have great value in the not-too-distant future.

"More than thirty years' experience in building photo-engraving, electrotyping and stereotyping machinery" is the claim of the Williams-Lloyd Company of Chicago. The mere arrangement of the words sets one thinking of the changes that have occurred during those thirty years. In 1879 we may be quite sure that photo-engraving did not occupy the leading line in the Williams-Lloyd announcements, yet nowadays they put it in front of electrotyping, and these relative positions mean a great deal more in the United States than they would do in the Old Country.

A. E. Dent & Co., Ltd.—The Annual Bean-feast of this firm took place on the 19th of June. Making an early start from town, the party journeyed by train to the historic town of Arundel, which was reached soon after ten o'clock. The park and river provided plenty of entertainment until dinner-time, when a move was made for the Red Lion. With Mr. A E. Dent in the chair, a jovial company did ample justice to an excellent repast, the usual toasts being proposed and duly honored with musical accompaniment. The afternoon was spent by driving to Littlehampton for a blow of the briny, returning to Arundel again in time for tea. As is usual with this firm, the outing expenses were equally divided between the firm and the employés, the soliciting of outside subscriptions being prohibited.

The Chemical Congress had several papers of great interest to process men, perhaps the most immediately important being Mr. A. J. Newton's on machine etching, with slides made from magnified sections of plates etched by hand and by various machine methods. Mr. Wm. Gamble had a note on dragon's-blood, in which he doubted whether the purified samples gave any practical advantage over good natural samples which sometimes contained as much as 40 per cent. of earthy matter. Mr. E. Howard Farmer discussed the trichromatic reproduction of autochromes, and Mr. Charles W. Gamble had a thoughtful paper on gelatose, which may prove of much use to all the crafts that employ sensitised gelatine.

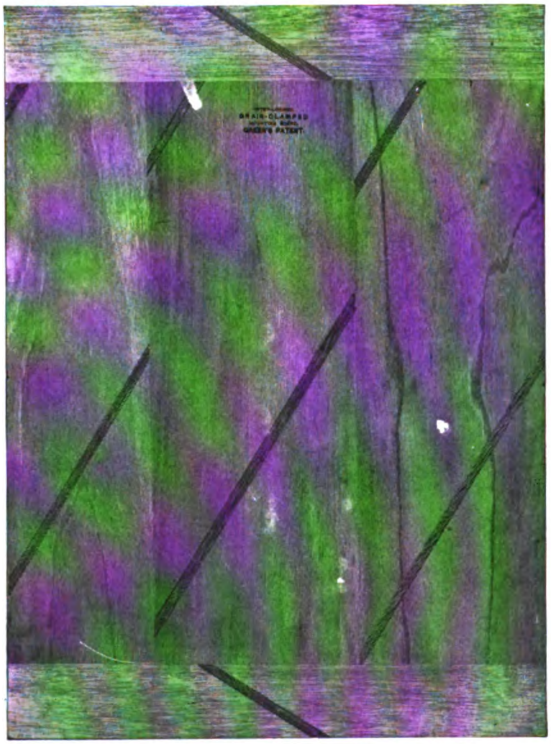
Green's patent Mounting-board, described as grain-cramped, inter-locked, of which we wrote a few months ago, is illustrated in plan and section by the cuts herewith. The makers, who have a very great experience of the ways and warps of wood, point out that the most perfect thicknessing and trueing is insufficient without clamping, because warping with changes of dampness and temperature is a part of the nature of wood, just as a high specific gravity is the nature of lead or mercury. Their patent boards are not only of selected and well dried timber, but are so constructed as to clamp the grain in every part of both sides, and even the clamps themselves are clamped.



Green's Patent Mounting-board. See over.

In Chile photo-mechanical work is constantly attracting more attention, and is probably growing as rapidly as anywhere in the world. Some of our keenest readers, who puzzle us at times with queries, live in that country, and our contemporary *Noticias Gráficas* is giving more and more of its space to the subject. So far as we can learn from our correspondence, most of the apparatus in use is German, as the German houses are well represented, and push keenly. British goods are appreciated, however, and we believe that British trade in our line is growing, though not so rapidly as might be wished.

Sir Joseph Wilson Swan is the subject of an illustrated article by N. S. Amstutz in *The Inland Printer*. Sir Joseph gives some interesting details of his earliest experiences in photography and photo-mechanical work, and incidently pays a tribute to Fox Talbot, "the true father of modern photography." Sir Joseph Swan says that when he undertook his investigations which resulted in the perfecting of the carbon process, he had in mind from the start two different results: firstly, the carbon print as we know it; and secondly, a process of photogravure printing based upon an intaglio made from the bichromated gelatine relief. In both directions, as we now know, he achieved considerable success, and his processes have almost world-wide employment.



Green's Patent Mounting-board. See back.

Daylight saving is attracting a great deal of attention in the United States just now. In fact, the Americans appear to be taking it up even more enthusiastically than its originators in this country, if we can trust the evidences in our exchange journals. One of the active propagandists of the movement belongs to our own craft, as he is Mr. Murdock, President of the Queen City Printing Ink Company of Cincinnati.

On the principle that the best way to secure the adoption of a measure is to adopt it, some of the Government and commercial offices have taken up the daylight saving method and have arranged for their employés to be at work two hours earlier in the morning and to cease work two hours earlier in the afternoon through the summer months. Of course, it is fully realised that it is much more difficult to carry out this scheme in individual offices than it would be if it were adopted by the whole country.

Correspondence.

THE FUTURE OF PHOTOLITHOGRAPHY.

The Editor, "The Process Monthly."

Dear Sir,—Your correspondent "Photo-litho" in the May issue omits an important reason why the thousands of pounds expended in experiments with photolitho have been wasted.

This waste and non-progress lies entirely with the artists' room, the members of which are entirely opposed to the introduction of photography, and refuse to give the necessary aid to make the process a success.

Tri-color photolithography is coming forward rapidly, but only in firms who have artists or draughtsmen who have not been in a lithographic room long.

W. T. Wilkinson.

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS ENGRAVER'S MONTHLY

THE PROCESS PHOTOGRAM — ESTABLISHED JAN 1894

VOL. XVI. No. 188.
AUGUST 1909.

Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly*.

Conditions of Process Engraving Workrooms.

THE results of an inquiry by the International Association of Photo-Engravers show some interesting figures as to the sanitary conditions of the workrooms in 247 process houses in North America. Ninety-eight per cent. report good means of ventilation of the general rooms, while 94 per cent. of the printing rooms and 84 per cent. of the dark rooms are reported as well ventilated. Efforts are being made to bring these numbers up to 100 per cent. In the zinc-etching departments 98 per cent. have ventilation to the outer air, but only 45 per cent. have closed fume-closets, or hoods with suction flues and power-driven fans. The conditions of more than half the etching rooms are regarded as a serious and insidious danger to the health of those employed; for ordinary window-ventilation is insufficient, and fails in the winter, when it is often most needed.

Hand-etching is deprecated, because it necessitates a dangerous amount of breathing of the acid fumes.

The intensifying or "cutting" rooms seem especially in need of attention, for 50 per cent. are reported as lacking proper ventilation, which is most urgently necessary for this part of the work.

Bichromate poisoning is reported as the cause of widespread injury, and the committee advises that all bichromate work should be done in rooms provided with sink and tap-water, so that it is quite easy to wash the hands promptly after contact with the bichromates.

Wet floors in front of sinks, resulting in wet feet—especially with workers who use thin indoor shoes—are regarded as a common cause of colds, and of predisposition to tuberculosis. Seventy-one per cent. of the workshops are reported as having running-boards or lattice-work on the floors in front of the sinks, and the adoption of similar arrangements is recommended in the other shops.

Fire-fighting apparatus is reported in 59 per cent. of the firms. Such apparatus, with occasional fire-drill, and with special attention to the lighting of exits and passages, is recommended. In this connection the keeping of benzine rags and other highly inflammable wipe-rags in metal cans is recommended, and the statement is made that these rags are subject to spontaneous combustion. Sixty per cent. of the firms use such metal cans at present.

The extensive drinking of pure water, "either hot or cool, but not ice or very cold water," is suggested as a means of combating the principal ills that specially affect the process trade. Not less than two quarts per day per man should be taken, with great care that it shall not come from neglected and foul cisterns.

The storage and handling of acids is the subject of several paragraphs in the report. An acid pump is recommended. Details of very serious accidents are given, and it is advised that every shop should have a large receptacle full of bicarbonate of soda, with a printed sign above it, near every stock of nitric acid. The sign, which is being printed and circulated by the I.P.E.U., reads:—

> THIS RECEPTACLE CONTAINS
> BICARBONATE OF SODA,
> AND THE CONTENT IS TO BE
> THROWN AT ONCE ON ACID
> WHEN SPILLED.
>
> WARNING! DO NOT USE SAWDUST.

Fighting the White Plague in our own Trade.

In the office of the public printer, Washington, D.C., the medical and sanitary officer has realised the menace of consumption in the printing and kindred trades, and has contributed an educational exhibit to the tuberculosis exhibition in the Museum of Natural History, New York. He has also published a pamphlet on "Industrial Hygiene," gratis from the Government Printing Office, Washington, D.C., and in sending us a copy for comment he writes:—

"I have been very much interested in looking over your publications and the articles contained therein which treat on tuberculosis, and it is with very great pleasure that I glean information to the effect that you are proceeding along systematic lines in calling the attention of workers in your art to this most important subject."

As the methods adopted by the Government offices should be of interest, we quote from the pamphlet at considerable length. If the contemplation of the subject is unpleasant, its neglect is terribly dangerous:—

"In ill defined, as well as those cases in the later stages of pulmonary tuberculosis, the expectorations from persons suffering from this disease form the medium by which the scourge is spread.

"Civilisation appears to have made provisions for the proper reception and disposal of all human excretions save sputum.

"Modern science has shown sputum to be, in so far as it relates to tuberculosis, more dangerous to public health than any other human excretion. We say, 'Do not spit on the floor; to do so may spread disease,' yet our method of disposing of the spittle, after this request has been complied with, is very faulty in a great many instances, to say the least.

"The problem would seem to be, therefore, how to devise a method for its removal that will reduce the danger of infection to a minimum and at the same time teach a lesson in hygiene and disease prevention that can be illustrated in a practical manner.

"In the United States Government Printing Office approximately 4800 persons are employed under one roof. Many have sedentary duties—many use tobacco, which excites salivation and consequent expectoration, and as a result about one thousand four hundred cuspidors* are required, which must be cleaned at the termination of each eight-hour shift.

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* Anglicé, spittoons.

"Some idea of the magnitude of this work may be gained when one considers that under the old system about four hundred barrels of sawdust were used each month, at a cost of $100, to fill spit boxes. The sputum caked and accumulated against the sides of boxes, which could not be thus properly cleaned, and as a result they were dangerous to health.

"Under the present method the cleaner picks up the used cuspidors, five at one time, in a 'nested' fashion, by a specially designed clutch, and with the movement of one arm only. The five vessels, so confined, are then carried to a box truck lined with galvanised iron. After the truck has been filled (they hold 140 cuspidors) in this manner, it is pushed to the freight elevator on each of the respective floors, and taken to the basement, whence the truck is wheeled directly into the sterilising chamber.

"The cuspidors are cleaned and sterilised with boiling water and steam, the contents of vessels being carried or flushed directly into the sewer by means of a drain pipe.

"After remaining in the racks long enough to dry, where they are placed directly after the steam and water bath, the operator pulls the vessels from the rack and places them back into the truck. As each layer of cuspidors is placed in the truck, about two or three ounces of a disinfecting solution is poured into each.

"The solution is used to disinfect the sputum and to destroy or greatly weaken all forms of germ life, including the tubercle bacillus (consumption germ) and the organism causing pneumonia in its various forms that may be found in the expectorations. The antiseptic remains in cuspidor until it is washed again.

"The solution is composed of bichloride of mercury, citric acid, and a coloring agent, and is odorless. The bichloride of mercury is used for its germicidal and antiseptic properties, tests having shown that the most resistent disease germs die when brought in contact with this agent in less than half a minute. The citric acid retards the coagulation or lumping of albumen in saliva, thus rendering the mercury more potent and penetrating to the mass. The coloring agent (eosin) is used to differentiate the solution from harmless liquids, such as water, as a matter of precaution.

"The operator at no stage of the collection or cleaning touches his hands or person to the dirty vessels, thus avoiding danger of infection to himself and others. The cuspidors were especially designed at the Government Printing Office, and made without any sharp angles or overhangs, thus presenting a vessel that is self-draining and permits of very easy cleaning.

"Experience has shown that it is almost impossible to have the ordinary stock cuspidors properly cleaned, owing to the sharp undercuts and overhangs and the repugnance of the work in general. They were made of hard, tough viterous ware to stand rough usage, and at the same time to withstand the corrosive action of bichloride of mercury, in addition to presenting a smooth sanitary surface for cleaning purposes. The cost is about 38 cents apiece wholesale.

"The chemicals going to make up the solution necessary for an entire year's supply in the Government Printing Office cost about $14 (£3)—five gallons can be made for less than 2 cents (one penny)—and may be purchased at any drug store or chemical concern. The labor of one man at $2 per diem covers the cost of operation for each twenty-four hours, or three eight-hour shifts.

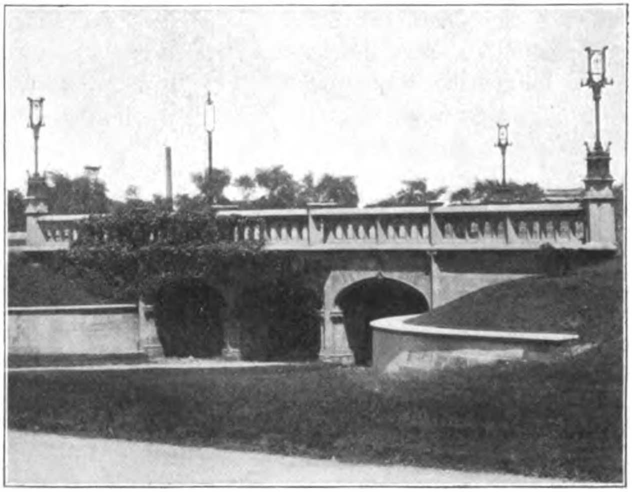
"No device or method in connection with this is patented, and all or any part may be freely copied by manufacturers and persons interested in stamping out infectious diseases prevalent among wage-earners. The use of technical language has been avoided in this description with that object in view."

✓

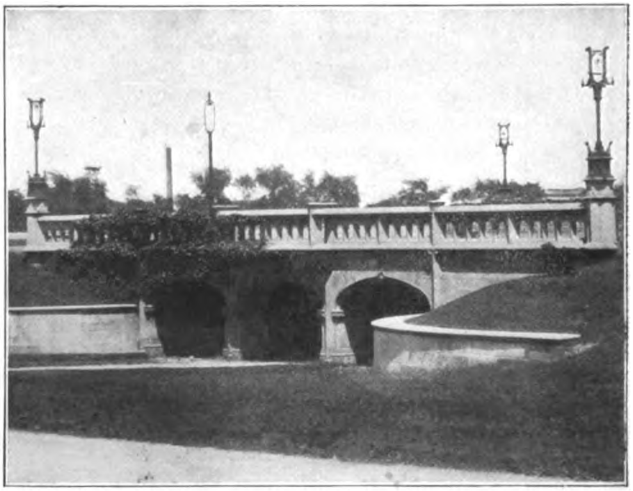
An Experiment in Electrotyping Half-tones.

A very interesting experiment was tried by the Globe Engraving and Electrotyping Company recently, and illustrated in *The Ben Franklin Monthly*. A fine half-tone was taken and electrotyped; from the electro a second electro was made, and from the second a third, and so on, up to the twelfth. As far as the eighth electro the quality remained very fair—surprisingly good, in fact, considering the conditions—but from the eighth to the twelfth the deterioration was rapid. Not only was the loss of detail accentuated, but the shrinkage, giving the outlines of the cut a "pin-cushion" shape, became very marked.

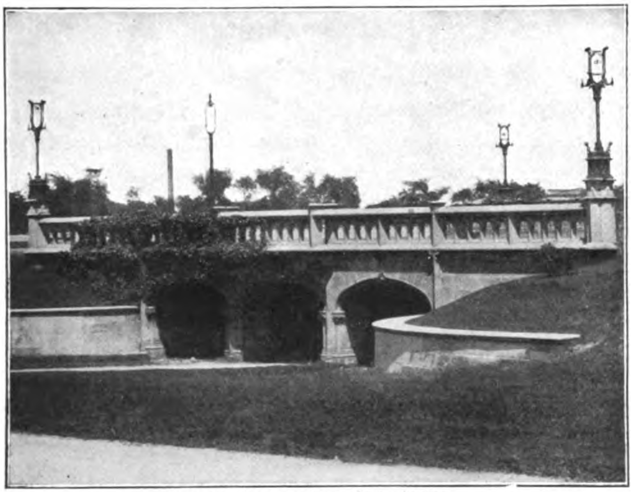
We are enabled, by the kindness of the Globe Company, to show prints from the original half-tone, and from the first, second, fifth, and eighth electrotypes, all of which have already run through an edition of seven thousand impressions. Mr. Benedict for the Globe Company says:—"Our theory is that the process we are using produces a shell that is an absolute duplicate of the original, and the deterioration comes from the handling, *i.e.* in the casting, roughing, and straightening. However, there is no sense in carrying the experiment beyond



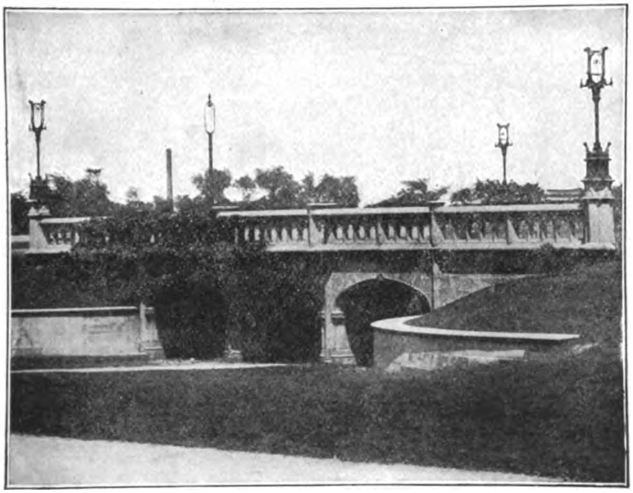
Original: 200 line half-tone.



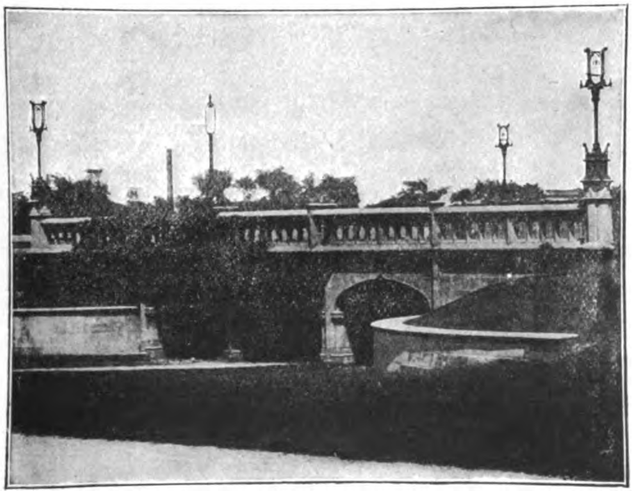
First electro: from original.



Second electro: from first electro.



Fifth electro: from fourth electro.



Eighth electro: from seventh electro.

the second electro, except to use it as an evidence of the infinitely small loss in sharpness and depth in electrotyping."

The possibility of carrying re-electrotyping so far with so little loss is the result of the use of a special machine invented by Mr. Benedict. Negotiations are in progress for the sale of the European patents, so that the machine and the method it involves may be available for our European readers before very long.

Ullman's Further Patent.✓

In further improvement of the method described in our issue of June 1909, Max Ullman, of Zwickau, says:—

"In the said patent a process is described for the treatment of printing plates in the photographic camera by direct exposure, so that the plate subsequently to be used for printing was prepared in the camera itself.

"It is not necessary herein to describe the process abovementioned, as the process according to the present invention is only commenced upon plates that have already been completely treated in accordance with the prior process.

"The present process provides a special treatment of the exposed and developed plates whereby particularly sharp and effective pictures are obtained.

"The process consists in subjecting the plates to a second developing and oiling or coloring; that is to say, after the plates have been developed and had transfer coloring medium rolled thereon, in accordance with the prior process, the plates are again placed in a developing bath of dilute nitric acid and subsequently again rolled with coloring medium.

"By this repetition of the developing bath it is, as already indicated, readily possible to obtain very sharp copies.

"Preferably the second developer is similar to the first bath, *i.e.* 4 per cent. nitric acid."

Half-tone Intaglio, and Relief Effect Plates from Type Formes.

By John L. Grabe.

A BOOKLET recently came into the hands of the writer which suggested an idea which may be of value. The cover was a half-tone reproduction of a design burnt in leather. Printed in brown ink upon buff paper, the work was striking and unusual. The design, while highly artistic, and, no doubt, costly, could be duplicated by a good printer with type, rule and ornaments. By simply taking a heavy impression upon leatherette of a color considerably lighter than the ink used, your copy is ready for the half-tone engraver. A heavy impression is necessary to give the sunken appearance to the burnt work, and the effect can be heightened by smutting the job judiciously and producing a scorched appearance. Of course, the engraving should be large enough to run off the trimmed work, and—if a booklet catalogue—should appear on back and front of cover.

Another artistic design, appropriate for various classes of work, is the half-tone representation of the architectural sculptors' or clay modelers' art. The popularity of these designs is well known. A close observer must have noticed, however, that in few cases has the lettering in these productions in any way approached foundry type in beauty of design, in most cases a neatly composed type-page being far more artistic and attractive than the printed impression of it.

There are two ways of making "relief copy" for the half-tone engraver from type-formes. The simplest is to make a very deep counter, as for embossing, on a job press. By damping a sheet of heavy bond paper and feeding it to the job in hand a very good relief copy can be made, though in reverse form. This, however, rather enhances the value of the copy to the engraver, as it obviates the necessity of "stripping" the negative.

The more desirable method—although requiring more time and labor—consists of making a matrix in plaster of Paris of the type-forme. Electrotype bearers are required for this method, and should be a half inch higher than the type in the forme. The forme is locked in the chase and the prepared plaster poured over the forme to the height of bearers. After the plaster sets, the quoins are released slightly and the plaster matrix lifted carefully off. The matrix is then placed face upward and the face shaved or scraped off until it presents a smooth surface and even depth with respect to the type. The entire surface is now treated to a thin coat of shellac, and when this is dry, the matrix (face upward) is surrounded by wooden furniture after the manner used in foundry formes.

This furniture should be at least eight ems wide and laid on its side, so that the final or engraver's copy be of a good thickness. The furniture can be secured in place with twine, after the manner of tying up type-pages. Plaster is now poured into the matrix, and, after hardening, the casts can be readily separated, as the shellac prevents adhesion.

The relief cast, after being secured to a wooden base by cleats tacked at the sides and top and bottom, is ready for the engraver—unless it is to be colored, which is advisable, as the best results are obtained from terra-cotta colored casts. **Large** heavy-faced type and ornaments **produce** the best plates, and the less **reading** matter used the better.

Machine Etching.

No. XVII. The Levy Acid Blast Etching Process.

With illustrations from Experiments made at the Bolt Court School and used in illustration of the paper by Mr. A. J. Newton at the Chemical Congress. See also p. 191.

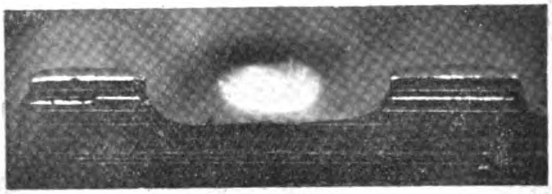
Condensed from notes on a lecture at the Bolt Court School by W. Gamble.

Previous articles and notes.—1906: I. Jan., Dr. Albert's Method; * II. Feb., Concewitz's Method; * III. March, Levy's Method,* and notes: IV. May, the Holmström Method; * V. June, Swain's Views on the Levy Method; VI. Sept., W. G. Thorpe's Method; * VII. Oct., The Mark Smith Method; * VIII. Nov., More about the Mark Smith Method; * IX. Dec., More about the Dr. Albert Method, and notes. 1908: X. Feb., More about the Mark Smith and the Dr. Albert Method; * XI. June, The Method of Guilio Danesi; * XII. July, The Boyce Machine; * XIII. Dec., Dr. Albert's Patent; * XIV. May, Piolunkowski's Patent; * XV. June, The Holt Etching Machine; * XVI. July, The Mark Smith Rotary Spray Etching Machine.

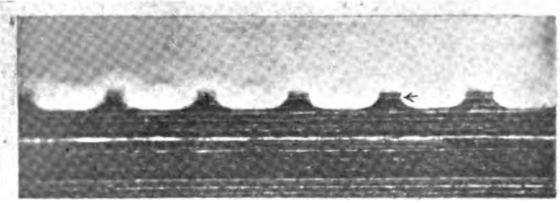
* Indicates illustrations.

Many years ago an old etcher showed me how it was possible to hasten the etching of a zinc plate by taking up the acid in a jug, and pouring it on to the plate from a height, the jug being held two or three feet above the surface, so that the acid fell in a steady stream on to the plate. This removed the oxide from the plate and kept it bright. This old etcher suggested that if it were possible by some mechanical means to keep continuously pouring the acid on to the plate, the etching would be done much quicker than by rocking. Unfortunately I did not realise the importance of the idea, which embodies the principle of the later developments of mechanical etching.

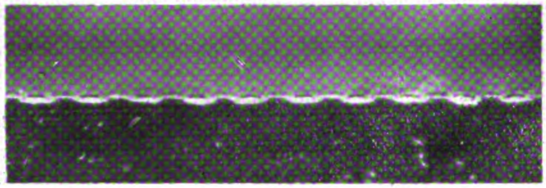
Some such idea must have been in the minds of the brothers Louis and Max Levy when they started experimenting on the production of a mechanical etching machine, which was ultimately



Coarse Half Tone   Levy Machine

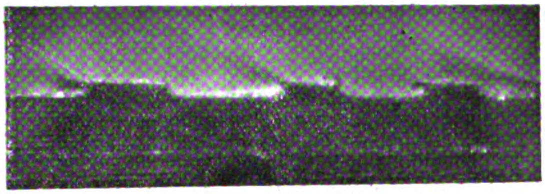


Half Tone Etching with enamel resist left on showing apparent undercut   Levy Machine patented in the year 1899. The idea from the first was to discharge the acid with force in the form of a fine spray.

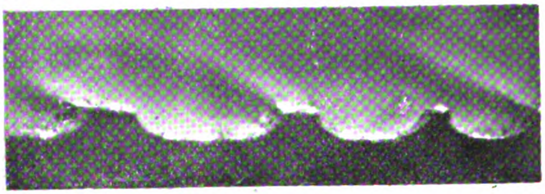


2½ min. 1:30 Acid Solution Tub Handrocked

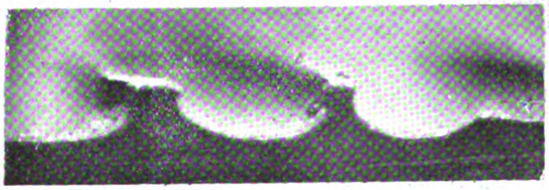
Line Etching by Levy Machine.



After 1 minute.



After 2 minutes



After 4 minutes

Magnified 28 times.

The idea resulted in a somewhat crude machine, chiefly constructed of pitched or impregnated wood. The results were promising, but the apparatus could not stand the work in a commercial shop. Hard rubber (vulcanite or ebonite) was tried, but was expensive, and not altogether successful, nor were combinations of wood or metal framed with glass, but it was found that the action of nitric acid on aluminium was so slight that this metal could very well be employed, and models of the machine were made for the most part of aluminium. Even this metal was eroded in time, and it was not until the machine was modified to make the acid-containing part of earthenware that there was a promise of durability. Even earthenware differs considerably in character, and some kinds are soon perforated by the constant action of strong acids upon them. Once the enamelled surface becomes cracked or perforated the core crumbles away. When I visited America in 1905, Mr. Levy had had considerable difficulty in obtaining earthenware troughs, although he had tried both American and German manufacturers. From Doultons when I returned home, I was able to secure stoneware troughs of a special composition of practically everlasting durability. Since then all the troughs for the Levy etching machine, both for the American and the English market, have been of Doulton manufacture, and have proved eminently satisfactory, which I think is a triumph for British manufacture.

The tendency of recent improvements in the construction of the machine has been towards the use of less and less metal. Where it has to be employed, aluminium has been found the most satisfactory. For the mechanical parts phosphor bronze is best.

The present form is the outcome of twelve years' continuous experiment and improvement, and it differs essentially from the one shown at the Paris Exhibition of 1900. In that machine the air was first forced into an accumulator, and thence through a range of water-surrounded pipes into the etching chamber, where it emerged from a series of openings, which formed the function of atomisers when the acid was in place. These injectors (from 60 to 120 in number) where disposed over the bottom of the acid trough, submerged in the liquid, while their nozzles protrude above its level and the escaping air current sucks in the acid and ejects it as fine spray against the plate. Formerly these aspirators were connected with a range of pipes underneath the trough; in the present form the air is forced into a sealed chamber whence it emerges through the aspirators as before.

The accumulator and water-cooling pipes are also dispensed with. These cooling pipes were thought necessary to dissipate the generated heat by the compression of the air, but Mr. Levy took advantage of another principle in pneumatics, namely, that when compressed air is expanded a cooling effect results. Thus whatever heating effect is occasioned by the compression is neutralised by the expansion of the air as soon as it emerges from the aspirators. This also absorbs the heat caused by the rapid corrosion of the plate by the action of the acid. Another useful effect is that the suction of the air back to the blower through the flue openings in the etching trough causes a partial vacuum, which increases the impact of the sprays, and causes a current to enter the acid chamber from the outside through whatever crevices or openings there may be around or under the lid of the acid chamber. This prevents fumes escaping into the room, as the direction of the current is inward, and through the flue. The air compressor is rotary, and totally enclosed. That is, it does not draw its air from an opening connecting with the room or outer air. The air is really drawn from the etching trough through the blower, and is thence carried through the aspirators and etching trough and back to the blower, so that it is being practically used over and over again with such addition and admixture as may reach the etching trough through the openings which it is impossible to close up around and under the lid. A certain amount of the air and generated gases escapes through the regulating valve, if it is not completely closed, and thence through a pipe leading to the open air. Thus neither the blower nor the etching trough can become choked with gases, and the constant admixture of oxygen from the air freshens the acid, and causes it to continue to act vigorously.

It may be asked what is the action of the acid or acid fumes on the wooden flue, the blower, and the pipes leading from it? Well, in the first place, the blower is charged with oil, which at the time the blower is stationary forms a bath at the bottom of the cating of the blower. As soon as the blades of the blower are rotated they throw up the oil until the interior is completely saturated with it, and thus it is impossible for the acid fumes or vapour to have any effect. If means were not taken to prevent this oil from escaping, it would probably be discharged with the air through the aspirators into the etching trough, but this is prevented by an oil trap between the blower and the air chamber. Any oil which is discharged into the air pipe runs back through a small pipe into the blower. As regards the wooden flue, which is considered necessary, because the vibration caused by the blower might break any joints if the flue were of earthenware, the action of the acid fumes is effectually prevented by making it of teak, and coating thickly inside with pitch.

The blowers are run at a speed of from 300 on the smaller side down to 250 on the larger size. By running them at a higher speed a higher pressure is obtained, but this is inadvisable, as it is found thereby greater heating is occasioned. High pressure is unnecessary, and whereas the early patterns were run at six pounds per square inch, two pounds is now the maximum, and the most successful work is being done with 1 to 1½ lbs. pressure. A half-pound pressure is sufficient for half-tones, or for the first etch in line work. The amount of pressure is readily seen by means of a mercury gauge fixed in front of the flue. The mercury rises with the air pressure in a glass tube in the same fashion as a barometer. The pressure is regulated by an ingenious valve of gun-metal, opened or shut by a lever at the side of the machine, so that the pressure is entirely under the control of the operator. A good feature of the latter patterns of the machine is that the pressure cannot be put on until the plate carrier is over the etching trough, and this plate carrier cannot be pulled back until the pressure is off.

Whilst the etching is in progress the plate is continuously moved to and fro by means of a spurred gear operating a crank motion. In this way the action of the sprays is equalised.

As soon as it is considered that the plate is sufficiently etched, it is pulled into a washing chamber, and a powerful spray of clean water is turned on. Then the plate holder is turned up and laid back to permit of examination of the plate, which can either be put back for further etching or removed for further strengthening of the resist. In the latest pattern, the plate holder can be entirely removed, which is useful for quick work, as by having two plate holders two etchers can work the machine alternately, one getting a plate ready and fixed to the holder, whilst the other has his plate in the machine.

Means for pouring the acid into the machine and for draining it out are provided by a funnel-shaped aperture with an opening connecting into it from the corner of etching trough, and the neck of the funnel is provided with a plug. So long as this plug is in place, acid poured into the funnel flows into the etching trough, but when the plug is drawn the acid flows out of the trough into the sink. An opening in the air chamber drains away any acid which overflows the aspirators, and connects to the sink with a rubber tube. The sink underneath the machine ensures cleanliness in case any etching solution is splashed or dripped over.

The strength of acid employed is usually about 6° on the Beaumé hydrometer, though in newspaper offices it is often increased in order to attain speed to about 10 or 12° Beaumé, which is equivalent to a proportion of about 3 parts water to 1 of acid. I don't think English etchers use such a strong bath, but about 1 in 5 strength. The etching solution can be used over and over again throughout the day's work, with an occasional slight addition of fresh acid, as the solution does not become sluggish in action as in the case of acid used in the ordinary etching trough. The gases and hydrate on the surface of the plate are carried off by the blast. It is unnecessary to varnish the back of the plate as there is no action on the back, nor is there any necessity to localise the action from the front as in the case of tub-etching, though the painting of the margins and large white spaces may be done if desired for the purpose of bearing up the roller if the rolling-up process is being worked. In the case of half-tone work an etch of thirty seconds, with half a pound pressure, an acid of a strength of 6° Beaumé is generally sufficient with screens not coarser than 133 lines to the inch, and with coarser rulings the time of etching is increased up to about three minutes in the case of very coarse work, such as 55 lines, and etched extra deep for rotary newspaper printing. The fish glue enamel, or the dragon's blood top, or a powered bitumen top, stands the blast very well throughout the first etching.

By modifying the character of the negatives in the direction of making them more contrasty it is possible to almost dispense with fine etching, because the etching is proportionate to the gradation of the negative, and does not tend to eat out the high-lights, nor to open out the shadows. Negatives intensified with mercury are quite suitable for making prints for the etching machine, and thus there is a decided economy in the studio work owing to the cheaper chemicals employed, and dispensing with the time-consuming operations of cutting and reintensifying. A little fringe on the dots is of no importance. It may indeed be a decided advantage for machine etching.

For line work it is best to employ the dragon's blood process and start with an etch of about thirty seconds' duration with half a pound pressure and 6° acid. A second etch after the four-way powdering may be two minutes, and a third etch four minutes, which will probably be sufficient in the case of close work, though a fourth etch may be given with a higher pressure and one or two minutes longer time. It is possible by hand powdering to get through an average line plate easily within an hour, but by the adoption of the Levy etch powdering machine from thirty to forty-five minutes, according to the character of the work, will suffice.

It is difficult to state definitely the exact time required for etching, as so much depends on the skill of the etcher in knowing just how far he can go to suit the work in hand. The method employed for forming the resist is also an important factor. Levy's own recommendation is to use acid of a strength of 8° Beaumé for the first and second etch, and 10 to 12° for the third etch. This, however, is thought by some operators to be inconvenient owing to the trouble of changing the acid, but Mr. Levy says the usual practice where many plates are to be etched is to run a number of plates through the first and second etch, and then put them in a stronger bath and run them through the third etch. In some American offices they use two etching machines, one for the first and second etch, and the other for the third etch. Other operators prefer to keep to one strength of acid all the time. The strength of the acid and the time required will, of course, vary according to the quality of zinc used and the depth required. Hard American zinc is said to be preferable, and the acid should be free from hydrochloric and sulphuric acids. If there be lead in the zinc these acids will not attack it. The average time for each etch in line work according to Mr. Levy is as follows:—first etch 30 to 40 seconds; second etch, 1 to 1½ minutes; third etch, 4 to 5 minutes.

The air pressure *must* be as follows: first etch half pound (this may be increased to three-quarter pound for some plates); second etch 1 pound; third etch 1½ pounds.

If the air pressure be too high for the second and third etch, there will be a liability of undercutting the dots.

It will be interesting to quote particulars of experience with the machine in *The Boston Herald*, where they have had the acid blast in use since the spring of 1900. Mr. Jean G. Stimmell, head of the art and engraving departments, writes: " Here are the schedules of work done on the machine for the last four nights. Even to me, accustomed as I am to the pace that kills, these nights grouped together were a caution."

(*To be continued.*)

Engravings in Advertisements.

(Some facts and ideas which process men may well impress upon their advertising customers.)

WHAT makes people look at the advertising pages of the big magazines before they turn to the reading pages?

What has made the big magazines possible?

What has made the mail-order business a mammoth industry in this country?

What has been the direct and primary cause for the miraculous increase in the volume and value of advertising in the last decade?

Art in advertising! Pictures! Engravings!

The February *Cosmopolitan* contained sixty-three full-page advertisements exclusive of its own. Among the sixty-three there were five in which no illustrations of any kind appeared. Twenty advertisements were full-page illustrations. Twenty-five contained illustrations covering half the space or more, and the remaining thirteen contained illustrations which occupied from one-tenth to one-third the area of the page in each instance.

The same proportions will about hold good on the small advertisements. Looking over an armful of the current magazines we find the most expensive space, such as inside covers and back cover-pages, occupied, as a rule, by full-page illustrations.

Just one more point. An abundance of advertising alone, while better than none at all, may still miss the mark. Quality should be your watchword. Looking at the matter in this light, you are about to formulate plans for a publicity or advertising campaign. You appropriate a certain sum of money to carry on this work. At this juncture you get the cost of illustrations to be used in connection with your campaign thought. If you are about to do a piece of work in your own line of business you will want plans and specifications; will carefully look over your material and the tools necessary to complete the task. You are consistent, as a rule, in all this except one, namely: you carefully go over data and statistics applied to circulating mediums; you aim to get a large circulation in an economical manner; you select class publications. Preparation of your copy receives considerable thought. The origination of illustrative advertising and plates is generally left at the last moment to any old engraver. Suppose you patronise direct or indirect an illustrating and engraving establishment. Place your wants before them and let them go to work for you to originate illustrative matter that will represent in a forceful manner your firm and yours only.—E. W. HOUSER.

The I.A.P.E. Convention.

From our Special Correspondent.

The Thirteenth Annual Convention of the International Association of Photo-Engravers was held at the Hotel Kaaterskill, Catskill Mountains, New York, on July 6th, 7th and 8th.

This location was a splendid one, and the representative gathering of photo-engravers from the United States and Canada attested the growing interest among the craft in the educational side of the business; for the programme was pre-eminently an educational one.

The usual details of business were transacted, and interspersed with the addresses there were social features that added to the interest of the Convention. One evening a straw-ride was participated in; on another a ball was the centre of attraction; and one afternoon was given over to a visit to the summer home of F. Wesel, some eleven miles away. A Kalteraufschnit (cold-lunch) was served at the club house of Elka Park, where Mr. Wesel's house is located. The scenery in the vicinity of the Kaaterskill is magnificent. Many were the remarks of pleasure that this spot had been selected for the sessions of the convention. The hotel lies about twelve miles from the Hudson river, and is about 2500 feet high. Some idea of the immensity of the hostelry may be secured by mentioning that the dining room accommodates 800 diners at one time.

The old officers were re-elected, except the vice-president and the secretary. The secretary, through pressure of business, was unable to accept the office for another year. Mr. George Brigdon of Toronto, Canada, was elected as secretary, and Mr. D. C. Heath of Buffalo, N.Y., vice-president; John C. Bragdon of Pittsburgh was elected treasurer.

The most marked feature of the Convention was the exceptional interest manifested in the educational aspect of the craft. The programme was splendidly gotten up by the president, Mr. H. C. C. Stiles, Washington, and Frank H. Clark, secretary, of Cleveland.

Mr. W. T. G. Weymouth, president of the Typo Mercantile Agency, New York, described "A New Draft System for Collecting Delinquent Accounts."

The Association endorsed the plan.

Mr. John Clyde Oswald, editor of *The American Printer* of New York, gave a very inspiring address on "The Photo-Engraver and the Printer from a Business Point of View," in a splendid and telling manner that brought forth many commendatory remarks among the members who were privileged to hear him.

Mr. Max Levy of Philadelphia described in an intensely graphic manner a photogravure process of rapid printing, exemplified by the Rembrant Company of England.

Remarks were also made by Louis E. Levy and N. S. Amstutz.

Mr. Arthur Fruwirth of New York spoke on and demonstrated "Focussing old and new" in a scientific manner, the basis of his principles being a recognition of the percentage a reduction bears to the original, and setting the camera base and ground-glass to such values on scales suitably fastened to the camera. His demonstrations were conclusive.

It was a special treat to the members and visitors to hear Mr. Will Bradley, Art Director of *Collier's Weekly*, New York, on "Color and Design." During his address he called attention to the practical problems in printing two, three, four, or five colors from a fast web press in immediate succession. There seems to be considerable difficulty in getting the quality of plate that will give the best printing quality and selective features.

Mr. A. W. Rathbun, treasurer, the Inland Walton Engraving Co., Chicago, Ill., spoke on "a complete cost keeping system." His talk was replete with practical illustration and advice, based on a number of years of actual experience of the value of adding to the labor cost of each job definite percentages to cover fixed and other charges, so that the "sinews of war" may be conserved and the chase of the sheriff may always be one of failure.

Mr. N. S. Amstutz, research engineer, of Valparaiso, Ind., spoke on "Science and Money in Photo-engraving." He touched on the necessity of the introduction of scientific methods into all phases of the business. Attention was called to the minutiæ of photo-engraving, entitling the profession to be called one of precision; the desirability of making extra charges for rush work, and the institution of a "piece" charge regardless of other charges or the size; the use of a "business barometer" to show the daily conditions of a business by means of graphic curves.

Mr. A. Muratti, of the Ruxton Ink Co., New York, spoke in an interesting manner on the relation between harmony in color and harmony of sound. Brilliant demonstrations were made with tube paints, showing the possibility of the artist using a prepared set of colors that bear a definite relation to the colors used in printing.

Mr. Louis Edward Levy spoke in a peculiarly felicitous manner on "Photo-Engraving: A Retrospect and a Look Ahead." Being, as some claim, the father of the American photo-engraving art, his address was full of reminiscences that led up to a brilliant peroration on the future. Having gone the full journey, it is but natural that he would have much of interest to relate.

Among the addresses, the president's annual report should be included, for it was of extreme interest.

The Bissell College was endorsed for another year, and the place for holding the next Convention practically decided on, though the executive committee will make its final decision later. Indications seem to point to Chicago as the next meeting-place.

The usual corps of supply men were present, their various exhibits producing variety on the Convention floor.

The weather was splendid, and rain was only encountered on one day for a few hours, bringing into blossom the greatest possible profusion of mountain laurel, with which the dining room tables were constantly graced.

A feature of the Convention was the secretary's report on the *Bulletin*, which showed a handsome profit on only six numbers, as two did not contain advertisements, and his report on membership, which showed that through his efforts it had been more than doubled during the year.

The Association has done much for its members during the last year: a reduction in price of ether, denatured alcohol as used in collodion base, and a probable rise in Customs duties on picture post cards, through a successful hearing before one branch of Congress. Its officers and members are wide awake and alert.

("The Process Photogram," August 1909

Trade Schools: An Important Factor in International Competition.

It becomes more evident every day that if Britain is to hold her own in the struggle for international trade supremacy, the highest possible efficiency of the workers must be maintained. This is realised very fully by the United States, which has the advantage of almost limitless natural resources, and by Germany, which has the advantage of an enormous rural population to draw upon—strong, healthy, steady, industrious workers, unspoiled by city life, and "passing rich" on wages which may be double their fathers' earnings as rural laborers and yet only about half what the British workman obtains in the same trade.

For years Germany has been building up a magnificent technical school system, the result of which is seen in many industries, but particularly in chemical and optical works. Many a man who would be an under-paid clerk in England is an investigating chemist or an optical mathematician in Germany. He works for very little more than the clerk would receive in England, but he has social advantages which he could not obtain in our country without a very much higher financial standing.

In the United States, still rapidly developing, and with enormous stores of natural wealth yet remaining unexploited, the conditions are very different. Wages (and cost of living) compare with those in Britain about as the British compare with the German. Technical education in the States has been somewhat neglected, except in the higher branches, where America has gone as far as any country. The American people and Government are now well awake to the importance of technical training in the handicraft trades, and an influential national commission has recently been studying the conditions in various countries. Its report, published a few months ago, showed that in its opinion the position of the countries as regards efficient technical instruction was: first, Great Britain; second, Germany; third, the United States.

As regards the actual equipment, organisation and extensive provision of schooling it put—First, Germany; second, Great Britain; and the reason for putting Great Britain first in efficiency was because of *the way in which the schooling was adapted to actual trade conditions.* In other words, the superior, the more extensive, and (for the whole country) the more expensive German system was somewhat pedantic, somewhat theoretical, somewhat inclined to deal with abstract principles rather than with everyday practice.

It is most urgently important that Britain should lose no whit of efficiency, that she should maintain every line of supremacy which she now holds, and work for supremacy, or at least for full equality, in every line where she has been outstripped by her friendly competitors. Here we can only consider the matter as it affects our own trade.

The leaders in technical education in our own craft and country are the Technical Education Committee of the London County Council, who took up and continued the work that had been begun most admirably by the Polytechnic, the People's Palace, and similar organisations. The committee has provided an excellent and thoroughly practical school, confined to those actually in or definitely intended for the craft, and with a very catholic advisory committee representing employers and employed, educators, investigators, publicists, and the trades' unions. While conducting the school on very economical lines—for the ratepayers' money is being spent — the Education Committee has never sacrificed efficiency for economy. The school is doing a good work; it has an increased membership and improved records of attendance every year, but the Education Committee is ever anxious to make it still more useful to the trade. Many other crafts in London are deriving far more help than our own does from the technical schools, and different arrangements are found suitable for different trades. In some cases the apprentices already indentured to the craft spend part of their afternoons (say twice a week) at the craft school, the L.C.C. paying their employers for the time lost. The Education Committee addressed a communication to our own trade asking whether a similar arrangement would be feasible, but in the majority of replies received a distinct negative.

The question of a scholarship system was next mooted, on lines which have proved successful in some other trades, and notably so in the furniture and upholstery trade of the east of London. This is a system evolved in co-operation with the employers and the trades unions, whereby the Council gives a limited number of scholarships each year to boys whose parents intend them for the trade, and under which the training-time given at the school is counted as a deduction from the time of apprenticeship.

The Advisory Committee of the Bolt Court School has been considering this matter for some time, and has visited some of the other trade schools maintained by the L.C.C. It is quite alive to the difficulties of the problem, and is especially desirous not to encourage lads to study for a craft in which they may not find sufficient openings, or where they may be tempted to work for reduced wages, thus injuring good men who are already engaged in the work. The general conclusions have been embodied in a "memorandum" by Mr. A. J. Newton, the Principal of the Bolt Court School, which we quote in full:—

"In accordance with the desire of the Committee, I submit the following considerations regarding the organisation of the day training course in this school. It must be remembered that it would be difficult to take more boys as things are now, but the matter should be ripe for proposals when we have a new school.

"There have been several endeavors made to interest employers in the day work of the school, but without great success so far. This, however, is quite normal, and I believe has been the experience of all day trade classes at first, though after the supply has been forthcoming the demand has been sufficient to absorb those trained.

"At present no qualification is necessary for entrance here, except either present occupation in the trade, or the declaration on the part of a parent or guardian of the intention to place the boy subsequently to the trade. From this it results that we seldom have students taking a full course, especially as it is often difficult for the parent to pay the fee, and that fewer still from an educational point of view are capable of taking full advantage of the instruction open to them here. The students coming to the evening classes are also seldom fit for theoretical instruction, having lost their taste for it. This is probably due to the entire severance from school life on entry into business. Thus, although we provide a course of lectures on elementary chemistry and physics in relation to photo-engraving, we have had only a maximum attendance of 8, with an average of under 4. When one special lecture was advertised an audience of thirty was secured, but though impressing the fact that these lectures were continued, only one additional student was entered. I cannot blame the lecturer or his subject matter; it is simply that the trade has not the *personnel* at present that wish to understand the fundamental principles underlying their work. This simply means that most future improvements will have to come from outsiders, and not, as they should, from those engaged in the industry.

"The only remedy for this, so far as I can see, is to take intelligent lads from the elementary schools having a bent for these crafts and offer them scholarships to enable them to remain for a thorough training in a technical school. By this means they would not break the continuity of their general education, and their aptitude to appreciate the bearing of mathematics, chemistry, and physics on these crafts would not become atrophied, as at present, but on the contrary would be easily and naturally developed. Such lads would be far more valuable to an employer than any lads he can obtain now, and once he had had such a boy it is probable that he would himself ask for boys similarly trained in the future.

"Naturally, it is desirable to ensure boys trained at this expense should be certain of engagements at the end of their course, but I see no means of securing this assurance. We must first have the boys ready to place, as it would appear that we cannot get future promises from employers. It is objected that there are already too many boys in the business, a contention that is difficult to deny. On the other hand, the school is not responsible for this, nor would it be if more boys were trained here: it would simply mean that the same number of boys will be engaged as before, other things being equal, with the difference that a few of them (for I suppose that no more than ten per annum will be trained) will be efficient and fit to do some intelligent work rather than act as errand boys, and doing only paltry mechanical tasks as they do for so long at present. It is also objected that such boys would replace men, but to this I reply that it is not likely that a boy without experience can replace a man with experience, if the man is in other respects as efficient; and if he is not, then surely it is for the good of the craft and the community that he should be replaced. This is a principle that would undoubtedly be harsh in operation, if (1) the crafts are entirely carried on by inefficient men, and (2) the trade were to be flooded by trained lads, but fortunately neither of these assumptions is possible. Ten boys per year is not more than the trade can easily absorb, without replacing any single man who is at present employed in it, supposing the trade is to expand, as it undoubtedly must. Finally, it should not be forgotten that the lads exist; are they to be trained and made better citizens, or are they to be left unskilled? If they are to be trained, what industry is there that they could be trained for that is in any better condition than our own for absorbing them? I know of none.

"My proposal would be that the Council should offer ten scholarships yearly for boys of thirteen years of age for a three years' course, or if fourteen years of age for a two years' course—boys competing to have some bent for handicraft work and some knowledge of elementary science or drawing. Their English education would be continued throughout the course, a general knowledge of photomechanical process would be taught at first, tending towards specialisation on some practical branch towards the end of the course. Details could, of course, be worked out if the committee favour such a scheme."

It is important that these suggestions should be considered most carefully by all who have interests at stake. While the capitalist, the workman, the manufacturer of apparatus and materials used in the craft, and the users of photomechanical reproductions, must all regard the matter from different standpoints, the question has a national as well as a personal bearing. The efficiency of the reproduction and illustration crafts is of the utmost importance to a commercial country, and that importance is likely to grow as education extends, and as trade is opened to the uttermost ends of the earth. The country whose manufactures are most excellently catalogued and illustrated has at least one great advantage in the markets of the world—an advantage that Britain cannot afford to lose.

Therefore, in considering anything that affects the efficiency of the illustrating craft, our readers are dealing with a problem of Imperial importance, and we feel sure that they will approach it broadmindedly.

An Electrolytic Etching Process.

Dr. Hans Strecker-Auffermann, of Munich, claims patent for "a process for etching, ready for printing, by electrolytic way, plates of any metal such as iron, steel, nickel, copper, brass, and so on, this etching being performed according to a common principle. The metal plates, which are provided with an image layer of chrome gelatine or the like, with or without graining, are placed as anodes in a bath with their faces turned towards a cathode. A screen may be copied into the layer, or it may contain a simple line drawing. The layer acts as a diaphragm which allows of the free exchange of the ions taking place.

"The known method of preparing printing plates by corrosive etching through layers of chrome glue hardened in the light is a purely chemical etching with concentrated iron chloride; whereas I have discovered that the so hardened layer of chrome glue, chrome albumen or the like upon the metal plate also permits an electric current to pass, and, upon this, base the electrolytic process which forms the subject-matter of the present invention. My invention enables plates provided with a hardened chrome layer to be more precisely etched, and it also enables the most varied metals to be etched. The electric current permits of copper which is provided only with a coating of chrome glue being etched not only with iron chloride but also with other salts, such as zinc chloride, which in a purely chemical application do not etch copper at all; and whilst heretofore it has been practically impossible to etch perfectly brass, copper, or zinc, which had no other covering than a layer of chrome glue or the like, there is no difficulty whatever in etching these metals according to my process. Iron chloride in a purely chemical application etches these metals badly, as it causes gases to be evolved at the surface of the metal which raise blisters in the chrome layer.

"As an electrolyte any concentrated solution may be used which has a tanning action on the layer of chrome glue or the like. The usually employed solution of ferric chloride is particularly convenient; but any of the solutions which are otherwise employed as tanning agents for glues, etc., can be employed with the same good result, such as, for instance, tannic acid, sulphate of ammonium, sulphate of zinc, chloride of zinc, sulphate of magnesia, thiosulphate of sodium, sulphate of copper, chloride of copper, sulphate of nickel, sal ammoniac, chloride of sodium, sulphate of sodium, chrome alum, ferricyanide of potassium, chloride of manganese, ferrous chloride, chloride of chromium, and so on, in aqueous solutions.

"The plate provided with the copy of the image is protected at its edges against the etching action by a coating of varnish, and is suspended in the bath as anode. The material of the cathode may be of any kind. The electrolyte is an aqueous solution of one of the above-cited tanning agents. After about five to fifteen minutes, during which time the electric circuit may be opened or closed, the layer composed of glue or the like swells to different thicknesses according to the image. When the circuit has been interrupted until now, it is closed and the etching begins, the ion of the acid wandering to the metal through the layer which acts as a diaphragm, whilst inversely dissolved metal goes to the cathode. As the current, according to the thickness of the layer, which varies according to the more or less strong exposure of the part of the latter, arrives to the metal, more or less easily an etching is obtained which renders exactly the image.

"The process can very advantageously be carried out by arranging, according to the principle of the intermediate conductor between the anode and the cathode, any desired number of etching plates the faces whereof which are to be etched are all directed towards the cathode and are consequently anodic, whilst the backs, which remain bare and must not be lacquered, are all directed towards the anode and are consequently cathodic. All the anodic sides are etched, whilst the dissolved metal precipitates on the cathodic sides, or hydrogen is set free on them when certain electrolytes are used.

"The intensity of current must be held in this process within low limits, and oscillates, according to the fineness of the image between 0·35 and 2 ampères per square centimeter. The electrolyte is generally constituted by ferric chloride at 42° to 30° Beaumé. The concentration of the bath is high. It is, however, sometimes necessary to use baths which gradually become weaker, or to produce a dilution of the bath by introducing water. The dilution can also be produced by separating the anode chamber from the cathode chamber by means of a diaphragm and using in the cathode chamber a diluted solution whilst the anode chamber contains a concentrated one. Diffusion causes the degrees of concentration to compensate, *i.e.* the solution in the anode chamber becomes gradually weaker. Here also it is not possible to give a fixed rule; it is, on the contrary, necessary to follow other well known indications. The tension of the bath depends upon the intensity of the current and upon the distance between the plates, and consequently immediately derives from these data. Generally it must not be too low. It is sometimes advantageous for the result of the etching to cause the current to be interrupted by jerks by means of an interruptor, and not to have it acting in a continuous manner.

"When the etching operation is completed, the plate is cleaned with hydrate of sodium or a similar material, whereafter it is re-etched in the ordinary or in the above described manner.

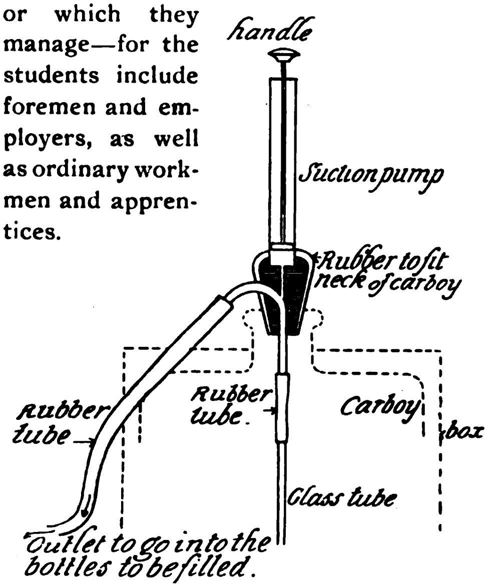
" It is not necessary in the cited process to supply current from an external source. It is, for instance, possible, like in the well known Daniel cell, to provide a zinc plate carrying a layer of chrome glue or a similar material and a copy of the image, and to dip it into sulphate or chloride of zinc or ferric chloride in front of a copper or lead plate arranged in a porous cup containing a suitable depolarising fluid, so as to obtain a cell having zinc and copper as poles and a diaphragm. With a view to preventing in this case, as well as in the process wherein an outside current is made use of, a precipitation of hydroxide of iron which, when zinc etching is carried out, would be formed behind the layer, a suitable material such as ferricyanide of potassium, oxalic acid, sugar, glycerine, citric acid, tartaric acid, acetate of soda, etc. is perferably added to the ferric chloride. When the circuit of the cell is closed on a resistance, or when the cell is put into short circuit, the etching process takes place. In a corresponding manner a Lechanché cell can be formed with sal ammoniac or sulphate of ammonium as an electrolyte and a solid depolarising agent, as, for instance, peroxide of manganese, the circuit of this cell also being closed on a resistance or short-circuited."

A **CHARGE OF FRAUD** through the mails has been made against John D. Nudd, who was the head of the School of Engraving, Boston, Mass., and who is said to have issued circulars stating that he would teach engraving in three months and guarantee that after this teaching the pupils could command salaries of $15 per week. The expert who was called by the public prosecutor stated that it took three or four years to learn the trade, and that at the end of that time the commencing salary would not be more than from $3 to $4 per week. Some thirty-five young women who had been pupils of Mr. Nudd were amongst the witnesses against him.

The Handling of Acids.

AFTER consulting with many of the foremen and etchers of the United States and Canada, the I.P.E.U. has decided upon the pump-siphon, illustrated by the sketch herewith, as being, upon the whole, the best and safest way of handling and decanting strong acids in the workroom. The diagram and recommendation are given in the report on workshop conditions which was issued recently.

As a result of our paragraphs reporting the advice of the I.P.E.U. *re* dealing with spilt nitric acid, the Principal of the L.C.C. School, Bolt Court, has adopted the advice, placed a large box of bicarbonate of soda near the acid store, and displayed the "notice" recommended by the I.P.E.U., which we repeat on p. 170. The value of this step lies largely in the influence it is sure to have upon students, inducing them to suggest or instal a similar antidote and "notice" in the places where they work, or which they manage—for the students include foremen and employers, as well as ordinary workmen and apprentices.


handle
Suction pump
Rubber to fit neck of carboy
Rubber tube
Rubber tube
Carboy
box
Glass tube
Outlet to go into the bottles to be filled.

Business.

The Tone Photo-Engraving Co. has removed to new premises which it has built in Lionel Street, Birmingham.

The Zinco Company, of which Mr. George Ziegler is the proprietor, has taken over the business of A. L. Puetz, with whom Mr. Ziegler has been in partnership for some years, and has removed it to 28-30 Little Manor Street, Clapham, S.W.

Collotype and Photo-litho.

Metalithography is the subject of a series of articles by Mr. Joseph Goodman in *The National Lithographer.*

The Dickinson Art Photo-Process Co. has moved from Brooklyn to 125 White Street, New York. It reports continuous and growing success in inducing lithographers to take the help that "process" can give.

Photo-litho: A Grand Testimonial.—One of the greatest typewriting firms in the world, which has much demand for multiplicated copies, is putting in a photo-litho plant. The manager claims that when twelve or more copies of typewritten matter are wanted, the cheapest and best way to produce them is by typing one good original and photo-lithographing the rest. By having only one scale of reproduction (½) the method can be worked very nearly automatically so far as the photographic side is concerned.

A two-printing effect that is very successful is used in some photolitho specimens sent to us recently from Mr. R. E. Wilkinson of Jarrold & Sons, Norwich. The two impressions are from the same stone, one in (say) dark brown and the other in (say) light brown, printed out of register to the extent of a fraction of the width of the half-tone dot that is used. In such subjects as old carved oak furniture the result is very good indeed, giving a richness and softness that are very difficult, if not impossible, to obtain at a single printing. The method was patented for letterpress many years ago under the name of Chemigraph, and is still being worked by its deviser, Mr. C. B. Woodward, of St. Louis, for printing some of the very best calendar and fine advertising matter.

"Tips" and "Wrinkles."

Payment is offered for brief practical notes and suggestions,—just those thousand-and-one little things that go to make work easier or more successful or more profitable.

Five shillings will be paid, on publication, for the most useful "tip" contributed in any month; and other payments of 5s., 2s. 6d., 2s., and 1s. are offered.

Every "tip" accepted will be paid for, and the payment will be governed by the apparent usefulness, *not* by the length. Three lines may be better than thirty.

Rules.—Write on one side of paper only. Each "tip" on a separate sheet or sheets, with the name and address of the sender, which will be published or not, as desired Address to "Tips," c/o the Editor, *The Process Monthly*, 6 Farringdon Avenue, London, E.C.

Stains of iodine may be removed by ammonia. Lay the stained print over a saucer of strong ammonia; the fumes will discharge the stain and not injure the print.

Reverses: Black for White.—On sensitised litho transfer paper pull a clean, sharp proof in good black ink from either a block or stone. Expose the paper to light, when the ink will act like the dense parts of a negative. Roll up with transfer ink and develop in the ordinary way, when the ink will wash away from the blacks of the original proof, leaving a reverse or negative design.—"Lithaprentice."

Cuts from Cuts.—If you have not an electrotyping plant you may still save the trouble of photographing, if you wish to duplicate a line block (or even, with very great care, a half-tone). Ink the cut well and evenly with *good* ink; roll a perfectly clean composition roller lightly but firmly over the surface, to take the ink, then roll the roller over a piece of clean polished zinc. Powder, melt in, and etch as usual.—Charles Shumway.

To emphasise portions in machinery illustrations, finish the bulk of the machine in pale greys, and the special parts in strong black and white. This can be done at any stage: in preparing the machine for photographing, in working up the photogram, or in etching. The effect is very striking, is little known and used, and the submission of a specimen or two to any mechanic who issues a catalogue should result in an order. Of course the same idea may be used for other purposes—as a costume with a landscape background. It gives the effect of the principal object being solid, while the surroundings are grey and half visionary.

Specimens and so forth.

Electrotypes of Emblems for Friendly and Fraternal Societies are a special line with the Hawtin Engraving Company of Chicago. They have one catalogue of over a thousand designs for these particular purposes.

The Baxter Printers, Messrs. J. M. Kronheim & Co., and their manager Mr. F. W. Seeley, should be immensely gratified by the press appreciation which has been showered upon the revival of an ancient, beautiful process, and which they have re-printed in a neat brochure.

Three-color poster work is being produced in very effective style by J. Furnelli, of Barcelona. The screen used is 40 lines to the inch; and the same class of blocks is being used satisfactorily in newspapers printed on rotary machines. That is, the work is satisfactory when viewed at its proper distance, though it looks very coarse when viewed from the distance at which the type of the newspaper is ordinarily read.

The Estate of C. K. Jardine, Decd., was wrongly described in a recent issue as a block-making house. They are printers, using half-tones largely, and reading *The Process Monthly* regularly (which facts misled us), but they obtain all their blocks from Garratt & Atkinson, of Ealing. Mr. D. K. Jardine asks us to state this fact, "as it is only fair that Garratt & Atkinson should get the credit for making the blocks, especially as they are well made, and a pleasure to print from."

The Proof, from the Gould Printing Company, St. Louis, Mo., is a well written, well planned, and well printed house organ, admirably calculated to foster the taste for more, and better printing. It has but one fault in our eyes,—it does not use half-tone so boldly and effectively as it might. In the issue before us the half-tone illustration is quite subsidiary, is mainly applied to initial-decoration, and, because the color-scheme includes a rather light blue, which is most effective for solid initial letters, some of the initial half-tones are printed in the same blue, which is not quite suitable for them.

Brevities.

An Etching Machine was described and illustrated in *Diderot's Encyclopædia*, published in 1767.

The *B.P.* strongly endorses three standards, of which one is "in blocks—a uniform height (type-height) of ·9170 inches."

The use of illustration in newspapers is increasing every day. *The Daily Telegraph* (London) is amongst the great morning newspapers now making large use of this aid to verisimilitude.

"Abominable Pictorials" in the shape of posters have roused the ire of Alderman White, on the Stockport Town Council, and he urged that the Watch Committee should take steps to check their display.

Red, yellow, and blue are not the primary colors, and Mr. J. Arthur H. Hatt has just published a book to prove it. We thought this was already a dead issue, on which there was no doubt or controversy.

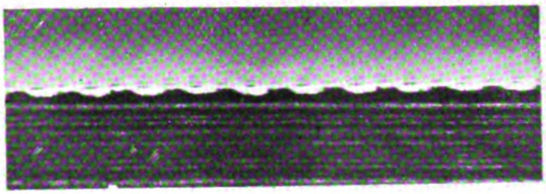
Mr. Howard Spencer Levy, son of Mr. Louis E. Levy, is in England again, to demonstrate the Levy etching method. His whereabouts may be learned from Penrose & Co., Farringdon Street, London, E.C.

At the Shepherd's Bush Exhibition you should be sure to see the Penrose installation for demonstrating the making of line and half-tone blocks on zinc and on copper, in *The Daily Mail* pavilion. The installation is under the management of Mr. Robert Vincent.

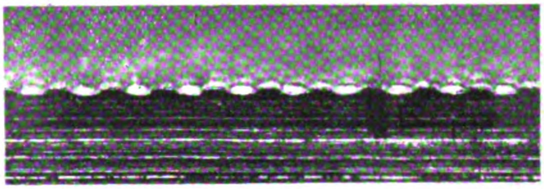
Erratum.—Page 139, first column; the formula given as $s.g. = \frac{144}{144} - R$ should have been made to read $s.g. = \frac{144 - R}{144}$. The correct rendering can be gathered from the context, in lines 5-7 of column 2 on the same page.

More Art in printed matter and illustration is the plea of an article in *The Master Printer*. It says, "The true beauty and appearance of all printing matter speaks for or against the management of any printing or engraving concern," and urges the constant effort for improvement, which means more work, better prices, with more and better workmen at higher wages.

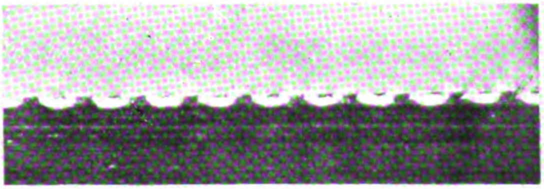
SOME MACHINE-ETCHING COMPARISONS, from the illustrations to the paper read by Mr. A. J. Newton at the Chemical Congress, are appended hereto, and will prove interesting to those readers who have followed our numerous articles on machine-etching—undoubtedly one of the most pressing subjects now before the process technician. Others of Mr. Newton's illustrations will be found on pages 175 and 176.



Albert Machine

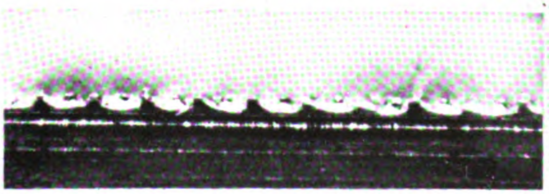


Mark Smith Machine



2 min. Levy Machine

2½ min. Levy Machine



14 min. Tub Hand Rocked

DRAGON'S BLOOD as supplied by the Star Engravers' Supply Company of New York is said to be 99·9 per cent. pure, for they state that they have removed practically the whole of the earthy matter and of the bark of the tree from which the blood is obtained, both of which adulterants are found to a considerable extent in all samples of dragon's blood as imported. As against the opinion expressed by Mr. Gamble, that the labor of purifying is not worth the cost, the Star people contend that it is well worth the cost and more. We shall be glad to hear from practical users who have tested both kinds thoroughly.

Correspondence.

The Editor, "The Process Monthly."

DEAR SIR,—In reference to the remarks of your reviewer anent my students' souvenir where he says a few notes would have been useful, I should like to remind him that a copy of this circular attached herewith* was sent out with each copy of the souvenir, and the copy sent to you must have been left in the envelope unemptied.

Had he received this he would not have committed the blunder of describing the Barnard woodcut illustration of "Poor Joe" as a "*line block*"; it was a photo-litho print from metal plate flat surface printing, and was done to show that lithography was the most versatile reproductive craft still, and that a most difficult and delicate illustration of an old time process could be reproduced by litho plan methods and printed on fabric infinitely better than a *line block could do it.*

* See next page.

I am sure also that he would have been more reasonable in his "frankness" as to the "evidences of hurry" if he could have been enlightened on the fact that this work was all done by the students at night, each class only meeting once a week, so that a student working in a class was only able to put in two and a half hours per week, and that part of this time was taken up with lecture and part with demonstration work, so that his work had to be cleared up each class night and put aside till next week; not sent out to be printed by professionals, or done during the daytime by old craftsmen paid for same, as is the case with another school. All the printing as well as the image making was done by the students themselves and as such should have been judged. This has been the course adopted by all the other technical journals and magazines who have all without exception recognised and applauded the remarkable results attained. Even the trade union officials and members of the local society have strongly complimented the results of the souvenir, and the various members of the local committee of the managers of the school have also bestowed their highest appreciation of the work.

You will from the above understand that it was not from any "lack of care" in the printing, as every student displayed the greatest enthusiasm and care, but they had to fight against time and carry this job through like a rush job in the workshop, where due allowance is always made for work done under such conditions; all the same it is a unique and creditable production of which the students are justly proud.

One of the students who subscribes to the *P.E.M.*, says that the reviewer could not have been a practical man, or he would not have commented on the choice of the paper and inks, since they were regulated by the processes themselves: art coated papers being necessary for half-tone blocks to secure best results. It must also be remembered that this work was done by hand from the press, and that little or no make ready could be done in the allotted time.

With this explanation I am sure your reviewer would have been able to better report this souvenir, and I regret that the letter of explanation miscarried.—Faithfully yours,

J. GOODMAN.

[* We append the circular which should have been considered in connection with the work. We still think that there were signs of unnecessary haste (*e.g.* the off-setting of ink). Selection of papers and inks for subjects is a matter of opinion; and we still think it might have been better in certain cases. We still think, also, that the souvenir would be more useful if the notes on the examples could be made a part of it, and not merely enclosed with it as a mimeographed sheet of different size. It is just because we appreciate the students' work (probably quite as highly as do those who have praised it without reserve) that we wish to see it presented in the best possible form.—ED.]

LIVERPOOL CENTRAL TECHNICAL SCHOOL.

Lithographic and Photo Process Technical Students' Souvenir.

The accompanying illustrated Souvenir of work produced by the students of the litho and photo-process classes of the above school is done as the practical and direct outcome of tuition acquired in the above classes; all the work being *done at night* by *artificial light* after the students had already undergone a full day's work at the workshop.

The work depicts the practical utilisation of the camera to lithographic printing methods, and embraces some of the latest, most efficient, and highly delicate processes yet attained and embodied in the alliance of photography with lithography.

Some of the subjects reproduced are those of the world's greatest artists and designers, examples of Wm. Morris, Walter Crane, F. Barnard, and others being depicted.

Some of the types of work represent new processes which have not been hitherto done at an exclusively evening technical school, and which the inventors have given special privileges to the Liverpool students to enjoy. These include the "Sears High-Light Photo-Litho Process," the "Shawcross Transfer Process," the "Patent Strecker Etching Process," and the "Metzograph Screen" poster grain processes. One of the above processes has been invented by a student of the classes.

Much of the work has been done also under the methods employed on the Continent, where they offer many advantages over our own.

As most of the modern craftsmen are brought up under the confined sectionalism of present-day economic factory systems, efforts have been made to afford him the fullest opportunities to become conversant with and to practise the other branches of his trade, so as to ground the craftsman in all the successive processes of his craft that he may become competent to accomplish a finished product right through if necessary, or to be able to supervise its passage through all the departments of his craft, to the completed entire state. At the same time he receives full technical tuition in the sectional department of his work, and the underlying principles of his craft as a whole, as well as the latest developments and alliance of photo-process methods.

This brochure has not been done without some additional sacrifice of time, and a display of creditable enthusiasm for the work which augurs well for the future success of the students, the outcome on which they claim has enabled them to produce this illustrated brochure of their work, which has not as yet been equalled by any other purely evening technical school in the world.

The examples represent:—1, Photochromo zincography; 2, line engraving on zinc; 3, half-tone on copper; 4, metzograph grain Sears high-light litho on zinc; 5, photolitho-aluminography of a woodcut, printed on fabric; 6, iris or graduated color printing from zinc plate; 7, line engraving on zinc; 8, collotype from brown paper original from School of Art studies; 9, half-tone high-light photolitho from aluminium; 10, photo-chromo zincography in six colors; 11, photolitho transfer prints by the Shawcross process; 12, line engraving; 13, photolitho transfer from stone; 14, photo zincography half-tone on copper; 15, chromo aluminography half completed; 16, photochromo aluminography, six colors. The cover was printed from line blocks made by the students of the photo-process class.

Estab. Jan. 1894.
"The Process
Photogram."

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VOL. XVI. No. 189.
SEPTEMBER 1909.

Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly.*

✓ *On the Structure of the Sensitive Films in Collotype and Kindred Processes.*

By Dogilbert in "Le Procédé."

IN the December issue 1908 of this journal there appeared an extract from a fully illustrated article by Mr. A. J. Bull, which showed by a happy coincidence the desire I expressed in the same number. To-day I allow myself to speak on the formation of images as affected by the physical constitution of the sensitive supports which form them.

Generalities.—A support or sensitive mixture is generally formed, besides its proper vehicle, of one or several organic matters, such as gelatine, albumen, resin on one hand, and the metallic salts of silver, chrome, ... on the other.

Carrying out the conditions of working and the end proposed, we obtain with these materials membranous supports yielding continuous images, or, inversely, supports grained, or capable of graining, by further treatment, for usually photo-mechanical processes demand that the image should be broken up to facilitate printing. The want of continuity can be caused mechanically or chemically, be natural or done on purpose.

Before examining some peculiarities of the means employed to obtain this want of continuity we can establish a general classification of them.

1st. Independent network, ruled, cross-lined, or grained, employed in making a discontinuous negative, or interposed between the sensitive film and a continuous negative.

2nd. Use of granulations in the supports by incorporation, precipitation, reticulation, pulverisation in liquids, or projection of powders.

3rd. Use of the natural properties of colloids or resins.

4th. Employment of mechanical methods (Amstutz, Petit, etc.).

5th. Use of grained supports.

Photography.—If we notice the grain of the image, we see it is much better characterised than the collographic support, and swells less in the non-exposed parts under the influence of the damping agents.

There is a close relation between the solubility and solidity of gelatines, and it is natural that the most resistant supports yield the longest runs in printing. The grain or reticulation is only visible to the naked eye in aggregate, and the number of elements can be modified or increased in volume.

It is interesting to note that it is not the grains themselves which hold the ink,

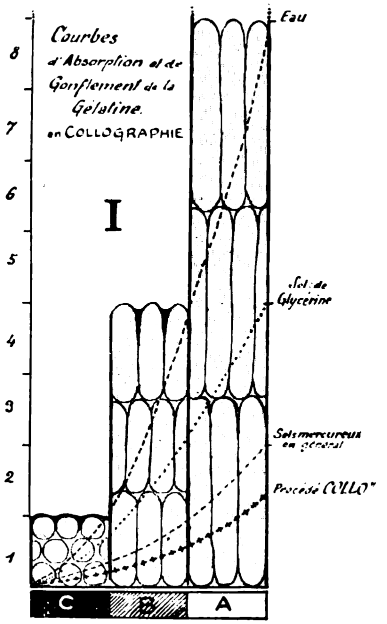


FIG. I.—Curves of absorption and of the swelling of gelatine in collography.

but only the intervals separating them. In reducing to their elements the constituents of gelatine we find hydrosal, gluten, hydrogel, and chondrine, the gluten enclosing the chondrine and this last being least sensitive to reducing agents. The aggregations are so much more numerous and less in size as these two elements are more or less represented in the gelatine. The size of the particles can be increased or diminished by adding to the emulsion at the time of spreading substances modifying the amount of absorption.

The faculty of absorption of water by non-exposed gelatine allows it to absorb about eight times and more its own quantity (fig. I.). The lengthening of the reticulations can only be vertical if the coating is fixed to its support, and there results an uneven surface which makes inking and printing impossible, as shown in fig. I., where A, B, C represent respectively the non-exposed, the partly exposed, and the fully exposed portions. Fig. II. in D and E shows what actually happens by the usual methods. We see that the cylinder compresses the particles, and quickly tends to make them useless in spite of their elasticity.

These repeated crushings of the ink-rollers and cylinder or platen dry the gelatine rapidly, the paper gradually absorbing the forced-out water. We have remedied these various unfavorable conditions by using gelatines swelling less, or treating them with alum or alcohol before coating. For the damping or "etching" we use glycerine solution to counteract the drying by the cylinders. The drying of gelatine after the critical point when the image "came" in a satisfactory way causes the gradual increase of inking until a new damping. This results in an irregularity in the edition, and this almost excludes the commercial possibility of three-color work. The addition of alcohol, alum, and various other agents gives a general fog independent of any photo-chemical action. In order to overcome this fog numerous ingredients have been suggested, of which I wish to retain only cyanide of potassium. We know this is an arbitrary choice, for the only quality sought lies in the carbonate which exists in an impure state in the cyanide crystals. But if we first treat a gelatine emulsion with certain mercuric salts, we obtain collotype plates having all the desired qualities, that is to say, keeping well, inking wonderfully, demanding only

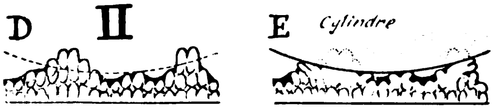


FIG. II.—Crushing of gelatine swellings by the impression cylinder.

few and short dampings, yielding a considerable number of prints with remarkable detail and great stability in the different values of the subject, easily allowing three-color printing. On the other hand, the relief is reduced to the minimum and the spreading to nothing. There is a double character exercised by these salts: on the one hand thinning the relief considerably; and on the other, a mechanical repulsion for the greasy ink, which perhaps presents some analogy with that of mercurography on zinc.

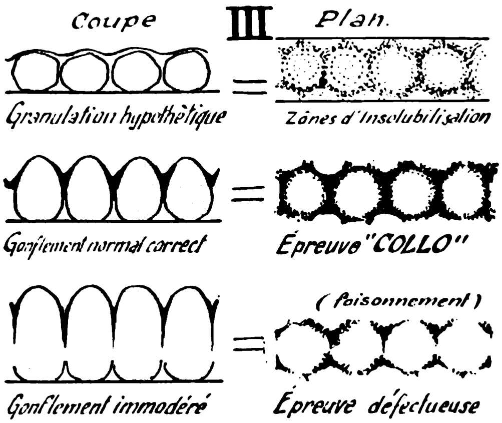


FIG. III.—Section and plan; theoretical grain, normal swelling; and extreme swelling; with the proofs therefrom.

The recent process "Collo," which is a perfecting of this method, plainly shows the above advantages, placing in everyone's power a practical method superior to all heretofore known; fig. III. shows the conditions carried out.

We have seen that the fog was often obtained by the presence of oxidising agents, but it is also often the result of light diffusion, and this can be obviated by using either inert pigments or colorings indicated by Messrs. Calmels and Clerc, which would also considerably reduce the length of exposure in the printing-frame. The complex residual parts of non-exposed chromated gelatine prove that non-exposure is never entire, and they favor by their inertia the porosity of the film and the gradation of tones. However—and this applies to other processes—if the film is to be kept for future runs, this becomes a fault, for the mechanical, lateral, or subjacent effort of the acid or solvent tends to separate the particles by capillary or osmotic penetration.

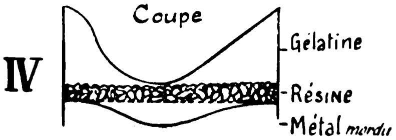


FIG. IV.—Section of photogravure, showing gelatine, resin grain, and etched metal.

Photogravure.—In my opinion, fig. IV. confirms the obligatory use of positives of different values described by M. L. Quatrebœufs, because the biting increases by inverse ratio of the cubic thickness of the film, without speaking of the aberrations introduced by the resistance of the gelatine to the exchange of liquids which translates an inclined plane by a curve. The resinous screen interposed would not compensate for this difference; and if its diffusing character is indispensable, its permeability is very little, and introduces one more resistance to exchange.

This resinous coating could perhaps be replaced by a membraneous permeable varnish, or simply by an adhesive which could be covered with resin or other substance refractory to acids, but whose grains do not overlap. It is only by memory I recall several other methods of graining, such as, for example, the use of waxed sand, which, thrown on the damp gelatine, is expelled by contraction when this dries, causing cellular markings.

Albumen and Enamel. — These two materials only furnish grained images in the case of photo-lithography on grained stone, or in the hygroscopic processes with powder. The hygroscopic quality of honey, sugar, glucose, or, simpler still, glycerine, forms the basis of these last methods. Reticulation on gelatine or albumen is gained by a sudden drop of temperature in the gaseous or liquid conditions, or alternately both gaseous and liquid. Enamel or liquefied fish-glue by itself is sufficient as a resist to acids, and a slight dry inking over the whole surface of the metal further increases this resistance. Albumen, under the same conditions, acts very differently; and if we make use of ammonia, inversion of the image is produced, the ink remaining adherent to the metal, the albumen refusing it. Hydrochloric acid also produces this phenomenon.

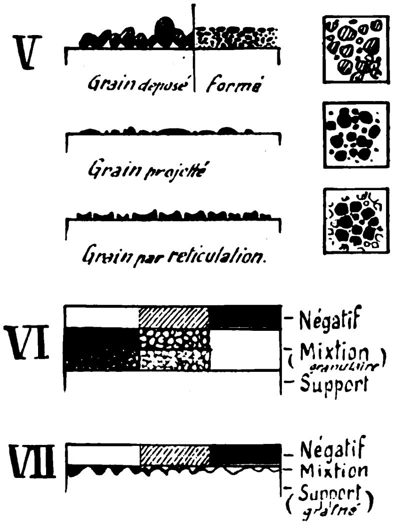


FIG. V.—Sections showing deposited, projected, and reticulated grains: VI.—negative and print on resist; VII.—negative and etched metal.

BITUMEN.—This is justly considered as yielding the clearest and best-defined images. Unfortunately its sensitiveness is so slight that, but for its strong resistance against acids, it would probably not be in use in modern processes. Enamel is its successor, and albumen well-treated is often substituted. Better than this last, and less well than gelatine, bitumen can lend itself to discontinuous prints by precipitating and holding in suspension the constituents of its solution. It is thus used always in photo- and chromolithographic processes by reason of the formation of grains proportionate in size to the transparency of the full-tone negatives.

The washing-up or development of images with bitumen is really an art, especially in the grain processes, where differences of solubility can be introduced by a variety of solvents, and where, in view of the slight adherence of granulations (figs. V., VI., VII.), it is necessary to proceed with great care.

The solubility of the unexposed parts in alcohol permits of direct inversion, which is eminently useful in some cases. Finally, a useful advice to aquafortists and lithographers who use bitumen varnish, consists in warning them against working in daylight with this varnish, which often has as a base Venetian terebenthin; the exposure of the bitumen and oxidation of the terebenthin making very difficult the raising of the film, and irremediably injuring the work done, especially if on lithographic stone.

PRESERVATION.—Gelatinous-like bituminous coatings can be kept indefinitely. On the other hand, coatings where the gelatine and albumen are not freed from chromates are sure of spontaneous solubilisation. Gelatinous emulsions and albumen solutions are biological mediums *par excellence*, and should be used with least possible delay, since even during manipulation, besides the chemical reactions inherent in the processes, they are liable to liquefy and putrefy spontaneously. The use of antiseptics is impossible, for the most active are incompatible with the processes where their activity should be useful. It is best to use only well filtered water; or boiled, for the colloidal solutions.

By the addition of acetic acid to the albumen we can keep chromated solutions several months, which must be rendered alkaline before use. Personally, I find it helpful to use carbonic acid gas by employing "sparklet" bottles, whence I take the albumen solution as needed by simple gas pressure without having to bring the mother solution into contact with the air charged with pathogenic germs. Bitumen should be kept from the light, and it is sufficient to shake it well and refilter after a very long rest.

Science and Money in Photo-engraving.

A Lecture by N. S. Amstutz, at the I.A.P.E. Congress.

THIS craft has much to look back to on account of past achievements. However much the fundamental phases of the business have been practically recognised, there is a larger field in the future, which will open to the widening touch of technical methods and the greater use of scientific procedure. This will lead the anticipation of your fondest hopes toward the realisation of ethical, commercial, scientific, and technical attainment.

It is well that one can individually or collectively, as in the capacity of this organisation, lay claim to that striking motto of modern Germania, under which she proudly aims to be in the vanguard of the world's progress. "Vorwarts, immer vorwarts"—Onward, always onward.

The subject, "Science and Money in Photo-engraving," is an all-inclusive one, for it is impossible to consider any phase of the profession without encountering either a scientific or monetary question. It must be related to much or little science, or again, to much or little money; thus whether more or less of one or the other is found in the daily exemplification of the business it is only a variation in degree, and not of classification.

MISCONCEPTIONS.

There has come to be a serious misunderstanding of the words "science and scientific." The layman looks upon everything of this kind with a certain awe. He errs in considering science as relating only to theoretical aspects of a subject, and a still greater error is the assumption that only centres of learning with elaborate appointments can be allowed to call themselves scientific. Likewise, there is a misconception of the monetary aspect, which has not alone to do with what is called dollars and cents, pounds, shillings, and pence, marks and pfennigs, or francs and centimes, but with that higher phase of all effort, human interest.

HUMAN INTEREST.

Any proposition shorn of this element may for a time show much on the right side of the ledger, and may even in a semi-automatic manner continue to produce a balance of profit, yet in spite of all the directing that pure system may apply, if there is not human interest the movement will become top-heavy and crumble and fall.

Human interest is one of the most valuable assets any business can have. It is so commonly considered a necessary qualification that its existence is generally assumed but seldom known.

The fundamental aspect of this part of the question applies with equal strength to the proprietor and to the craftsman, and when co-existent with both it must inevitably produce the very highest type of industrialism.

Absence of Human Interest—Results of.

Its absence is found, in the case of the proprietor, to produce a driver, a mercenary who is bent on grinding out the last vestige of effort from those on whom his enterprise depends, so as to add farthing on farthing of monetary gain, regardless of the vital element of perpetuity. In the craftsman its absence develops the clock-watcher, the derelict who simply drifts, becoming a menace to all others who need to steer their ships of daily effort with continuous application to the satisfaction that "work well done" inevitably brings.

Holding Interest.

When genuine loyalty of man to man exists, the proprietor may know that those on whom he depends have the details of the business at heart; the craftsman will realise that his efforts are appreciated; and both will know that they are absolutely essential to each other in the making of a "going concern."

Science and Knowledge.

Reverting to the scientific aspect of things, let us look into the matter in detail and ask, What does science mean? What does it stand for? Primarily it stands for method, order, regularity, etc.

The highest authorities say that science in its most comprehensive sense only means *knowledge*, and in its ordinary sense means *knowledge reduced to a system*, or, in short, *classified* knowledge. One may have bushels of information but little knowledge and no science, because the information is not available, for classification is absent.

As soon as order, method, and definite arrangement are introduced, the procedure becomes scientific, because of these very steps, and not through the exercise of some occult or mysterious influence.

Every phase of the production of illustrations must be scientific to the extent that it complies with these fundamentals, and there is no aspect of the craft that does not come under this designation.

As "time is money," the conservation of mental and physical effort, if done systematically, must perforce be valuable in the twofold sense of science and money, from which is found the justification for selecting the title of this address.

The Birth and Continuity of an Establishment.

Suppose that one is contemplating the establishing or expansion of a photo-engraving business, he must be scientific at the outset if he is to make any money at all. He must consider in regular sequence—

1. The demand for business in the proposed location — section of country, etc.
2. The capacity of the plant for immediate use and allowance for future expansion.
3. The required investment to put into effect the plans made.
4. The selection of a staff to man the enterprise.
5. The procuration of the necessary materials and supplies.
6. The organisation of the clerical details to record the daily transactions.

Supplementary to this is found the necessity of arranging for the following:—

1. A proper compensation for supervision and administration.

2. Adequate compensation for the operative force.

3. Efficient and economical administration of the materials and supplies department, including power-arrangements, light, sanitation, etc., etc.

From and through the proper co-relation of these divisions there must result—

1. A reasonable interest return on the whole investment.

2. An additional earning, at least 10 per cent., to cover depreciation of machinery, plant, etc.

3. An additional earning to cover the retirement of the money invested, within a given time.

4. The establishment of a reserve or contingent fund to meet extraordinary exigencies.

The divisions just listed show the different phases of every photo-engraving (or, for that matter, every business) undertaking, and the list enables one to see just what must be provided for. In the main the details of all photo-engraving establishments are practically the same. Zinc must be bought as well as copper. Wood, chemicals and apparatus, comprising cameras, arc lamps, lenses, screens, sensitising baths, planers, edgers, bevelers, routers, proving presses, grinders, motors, etching troughs, heaters, etc. etc., must be procured. These and many minor matters are necessary before an engraving can be turned out.

The cost of all the features enumerated must be covered proportionately by the selling price of the engraving, and they cannot be overlooked even though the proportionate cost per order is obviously a largely varying one, in various states of demand.

SCIENCE AND ACCOUNTING.

A correct handling of the details of accounting requires specialised scientific treatment.

There is just as much science in the careful analysis of costs all the time, and the profits now and then, as there is in the consideration of the most complex problems in mechanics, electricity, chemistry or astronomy. It comprises a definite relation of costs to profits, a detailed listing of various minor costs with respect to larger ones, and these in turn with the output of the business "turnover," the relation of labor, the costs of chemicals, of supplies used in a given time to the total output; the administrative, maintenance, and fixed charges to the annual totals, etc. It is essential to know the subdivisions mentioned, and in many cases recognise others as their need may arise from time to time.

A most valuable adjunct in this field is found in what may be called a "business barometer," which will show the features of any business, in weekly, monthly, semi-annual, annual, or other periods. The great importance of this plan is found in the fact that the trend of events is instantly shown, and any given period can be immediately compared with any other in a moment and existing variations noted (see p. 201). Thus the manager can see graphically, day by day, how the business is proceeding. This "barometric" record is made up of total values supplied by the accounting department, and as it deals with totals the manager is not troubled with specific details until some decided trend in the graphic curve shows just what part of any department requires attention.

"PICTURED" INFORMATION.

As an accessory to modern accounting

this method will show pictorially in the most conclusive manner the condition of any business that is "pictured" in graphic curves, its great value lying in the fact that the relation of all the factors, or as many as are desired, are seen at once. The trend of events is foretold in the most positive "language."

This is the kind of information that the busy man needs—something on which he can prognosticate future eventualities with a fair margin of probability. If he wants to see the future in the light of the present and the past, under the assumption that existing conditions will remain the same, he can with great definiteness foretell what their continuation will bring forth in one, two, or three months, or even a whole year, in advance.

One of the managerial advantages of this method lies in the fact that the broad general relation of the various items is shown without the laborious use of minutiæ. It is quite remarkable how pointedly the information is given so as to be recognised at a glance. The rapidity and compactness of the method should commend itself to the busy proprietor who desires to know the "lay of the land" with respect to his business.

The purely physical record may be expressed in any desired nomenclature, so that the photo-engraver may use square inches, or pounds of copper and zinc; ounces, grains, or grams of the more expensive chemicals; gallons of etching solutions, etc., and the time when made up, so that if co-ordinately, a record of the specific gravities is marked alongside of the square-inch output it will at once be apparent how much the output changes with the weakening of the baths, etc. Numerous other inter-related factors can be readily ascertained if marked day by day. When the trend of events is unfavorable it is time enough to make specific enquiries, and consider detailed items of daily procedure.

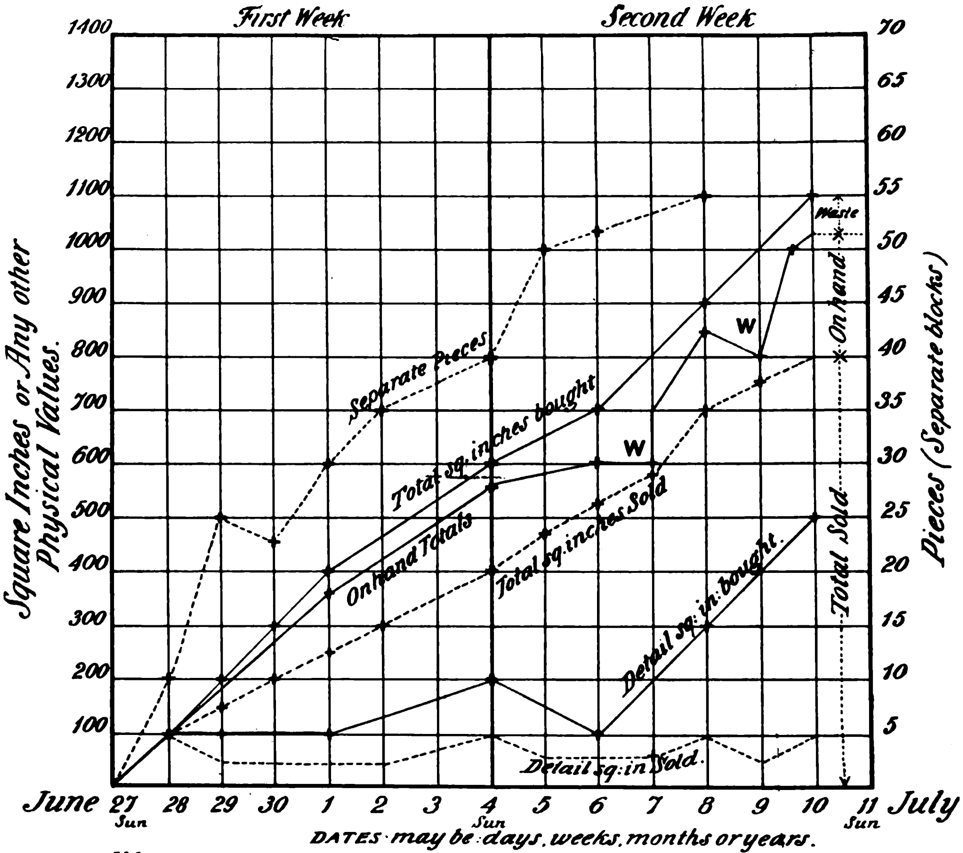
Without such a system it is impossible to *at once* locate the region of trouble, and the nervous instability produced is many times worse than a "face to face" encounter with the actual difficulties. The acuteness of the fears and the helplessness of the manager may be compared to the warning given by a burglar alarm system that has no automatic location indicator.

The superintendent, manager or proprietor when not provided with a location indicator in the circuit of his business régime, may feel in a sort of intuitive way that there are "burglars" around, but as to the point of attack he knows nothing until the necessity for care has passed, and it is too late to lock the stable because the horse has been stolen. Knowledge of an abnormal variation in the rate of change that a business is undergoing, either in a physical or monetary sense, is the important thing. "An ounce of prevention is worth a pound of cure."

The keeping of this kind of record is extremely simple. The use of graphic curves in this connection is not new, but it is believed that the special procedure pointed out in this specific adaptation will be of no small importance to practical process men.

A graphic curve shows very plainly the relation between two factors. The vertical divisions may represent physical or money values and the horizontal ones time, expressed as days, weeks, months or years, etc.

Photo-engraving houses can adopt this plan with much profit to themselves. Not more than fifteen to twenty minutes of each day is required on the part of a clerk to mark the various totals on the chart, joining them with lines to the respective



W. – *Excessive Waste.*

totals of the previous day. The height of the line above the base will show the value at any point.

To compare one sheet with another week by week, month by month, or year by year, make the record on semi-transparent paper ruled with cross-lines and place one sheet above the other, in register, then the variations will be apparent at a glance.

If once a manager by personal experience sees the extreme value of this method he will wonder how he ever got along by placing dependence on tabulated figures only. The system is supplementary to the regulation accounting methods, and is intended almost entirely for managerial purposes.

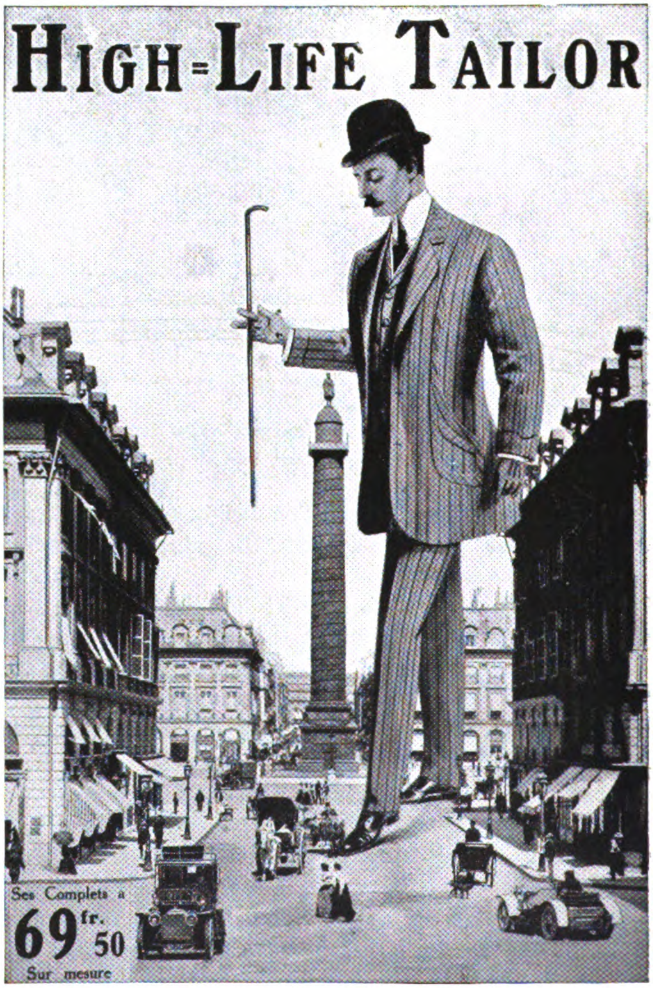
It is an anomaly that every detail in the line of accounting, etc., that can be done by mechanism is so done, yet the manager himself has no aid to show the trend of the business at a single glance.

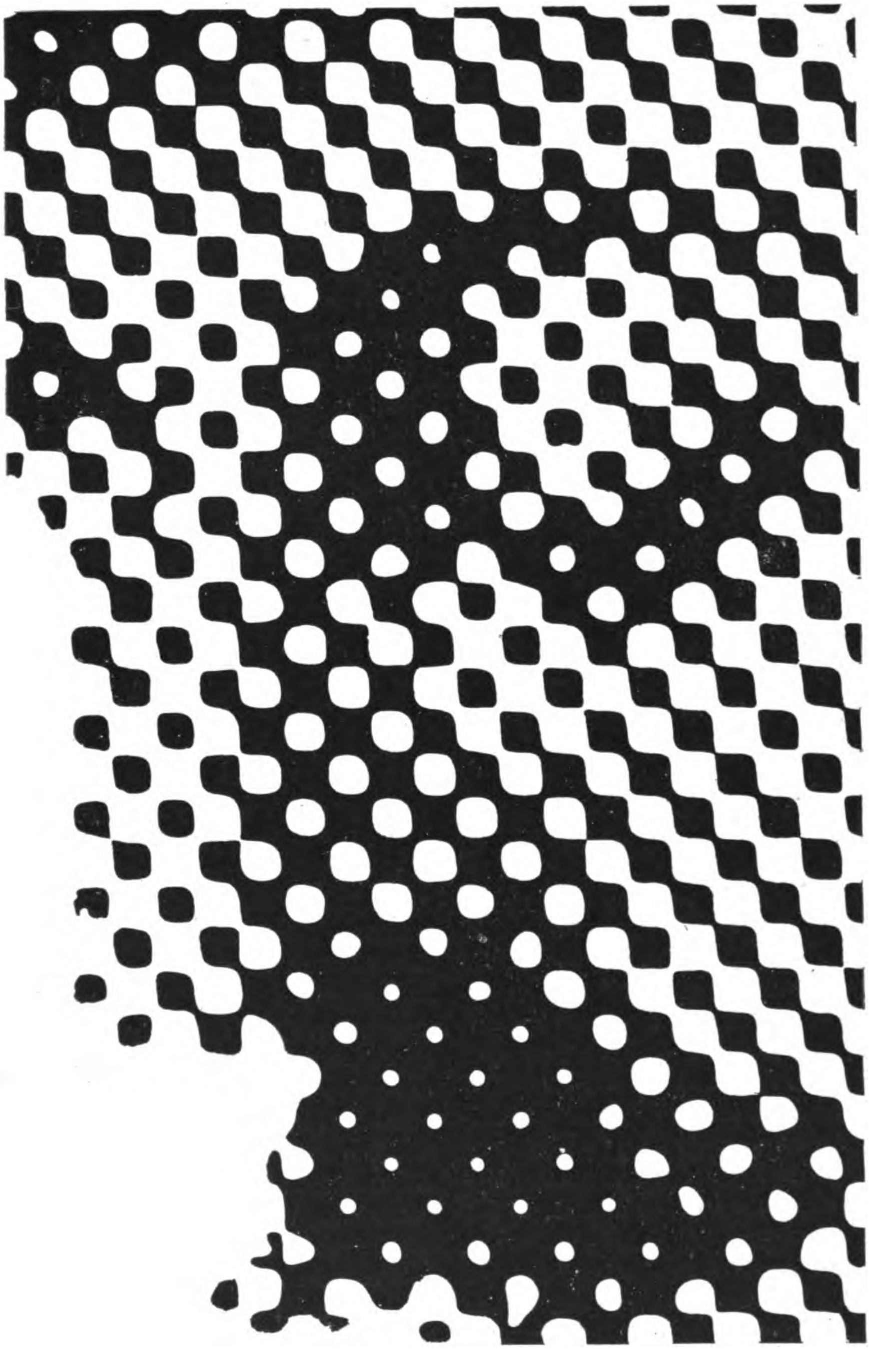
Everyone realises the importance of every proprietor having at least a general knowledge of the craft, but still more essential is exact information, whatever its extent. In our great railroad systems the way to promotion lies along familiarity with everyday practice. In photo-engraving the custom seems somewhat different, but why should it be? From this basis, it is believed, arises that ubiquitous Banquo's ghost, price-cutting.

No person engaged in business will knowingly persist in turning out work simply for the fun of it below cost; yet much work is done on this unfortunate basis. Is it possible that the persons who are thus guilty of commercial suicide are hypnotised into the belief of the fakir who sold crackers (biscuits) at one cent a dozen less than he had to pay for them? On being asked how he could afford to do so, said, "It is a ticklish business and needs close watching, and I can only keep it up because I sell so many of them."

Photographic Posters.

PARIS is being stirred up to the use of large coarse-screen half-tones for poster-work, and we think that our readers will be interested in a reduction of one of these pictures used for the Paris firm "High-Life Tailor," to whose courtesy we are indebted for the use of the subject, and also for permission to borrow a block from our contemporary, *Le Procédé*, which reproduces a portion of one of the posters in actual size. The posters that are being used by the High-Life Tailor are printed by the firm of Draeger of Montrouge, and measure just over 12 feet × 7 feet 6 inches. In each case they represent a man or woman of gigantic size dominating some familiar Parisian street scene or landscape. The figure is on about thirty times the scale of the landscape, as will be seen from the example, in which the man is shown in the Place Vendôme. The screen coarseness is equal to about 125 lines to the metre, or, say, 115 lines to the yard. The picture is printed in black, as a final key over five printings in flat colors—green, pink, blue,





A portion of the black "key" of the High-Life Tailor poster. Exact size of texture as used on the hoardings.

red, and brown. Although the screen is so very coarse, its effect is modified a good deal by the tints. It is practically invisible when the picture is viewed from a distance of thirty feet, and even when seen from a fifteen-feet distance the dots are not sufficiently noticeable to be offensive. In making these posters an ordinary photographic print of about half-plate size is used, and upon it is laid the carefully cut-out figure, which is photographed about 4½ inches high. This print is used as the original for a half-tone negative, made with a screen of 25 lines to the centimetre, just as is used for illustrating the daily papers. From this negative an enlargement of about 20 diameters is made in the lantern upon bromide negative paper, using nine sheets as a rule, since the enlargement could not well be made upon one. The illustration on page 202 is about $\frac{1}{26}$ the diameter and $\frac{1}{700}$ the area of the original poster.

The Cheffins Underlay Process.

Stanley Herbert Cheffins, of 12 Wine Office Court, London, E.C., declares in his patent specification that his invention relates to an improvement in the production of printing surfaces such as are provided with an integral underlay on the undersurface of the printing plate, to avoid the necessity of making ready and the employment of a separate relief or underlay. He says:—

"I apply a proof of the impression from the original engraving or etching to the back of the printing plate in register with the upper face, and according to the invention I then by means of a routing tool take away the metal from the 'lights' at the back of the plate; I then subject the plate to pressure in a press after first interposing soft paper on the top of the plate so that thus the parts undercut or undermined sink below the upper surface of the plate, and thus an effective underlay is produced on the plate itself, by which packing or making ready and the use of separate underlays is avoided.

"It has been previously proposed to apply a proof of the impression to the back of a plate and to etch away the metal from the parts not covered by such proof. It has also been proposed to produce difference of level in the surface of printing plates by removing metal from the underside and then by pressing from the front."

A New Building for the Bolt Court School.

We are very glad indeed to report that the London County Council decided, at its meeting on the 27th July, to purchase the site of the present L. C. C. School of Process Engraving and Photo-lithography at Bolt Court, and to set thereon a building really worthy of the excellent practical work which has been done there since May 1895. The site is being bought at a cost of £15,500, and the building to be erected on it will cost about £4500. It is scarcely to be expected that the work in the new premises will be more efficient or more practically valuable than that which has been carried on in the old inconvenient small-roomed building, but there is no doubt that it will be conducted much more easily and pleasantly both for instructors and students, and also that the new building will give the increased accommodation which has been rendered absolutely necessary by the success of the school. Not only are some of the classes overflowing and obliged to be held in duplicate or triplicate, but there are certain subjects in which it seems desirable to hold other classes or to give an increased number of lessons, which cannot be accommodated in the present building. No doubt, during the construction of the new School a good deal of attention will be given to the question of apprentice-training, as discussed at some length in an article on page 183 of our last issue, and it is to be hoped that by the time the new building is ready for occupation our trade will have decided upon what is the best form, if any, for this particular kind of instruction to take. Many of our readers who have never been students in the School have reason to be grateful to it for the excellent investigation work that it has done, and for the way in which Mr. Newton and his staff have solved some of the technical problems and have removed many of the incidental difficulties that have been met with by men engaged in the trade.

A Serious Trade Dispute.

A STRIKE and lock-out, of which it is rather difficult to understand the true inwardness, is in progress in San Francisco, to which city Matthew Woll, President of the International Process Engravers' Union, has gone to conduct the matter personally. He is reported as saying that the Union has some £8000, every penny of which it will spend in the struggle if necessary. The trouble has occurred with certain newspaper proprietors who use patent blocks, and who therefore ordered their half-tone departments to supply the cuts unmounted. They allege that the block departments refused to do this, and insisted on supplying all cuts mounted on wood or soft metal, saying that the printers might strip off and throw away these mounts if they wished to use the patent mounts. Such an attitude seems so unreasonable and such a method so wasteful (especially in a newspaper office, where time is of the highest value) that we cannot believe the statement to be strictly correct and complete. A statement attributed to Mr. Woll is that "the Photo-engravers' Union has nipped in the bud a plan by some of the employers to break the existing union agreement"; and it is further alleged that the use of the patent mounting blocks transfers from the photo-engravers to the compositors a part of what is only engravers' work. *The San Francisco Examiner*, *The Chronicle*, and *The Bulletin*, have locked out their photo-engravers, and have been supported by the Bingley Engraving Co., Brown Engraving Co., California Engraving Co., Calkins Syndicate, Commercial Art Engraving Co., and the Sierra Engraving Co., all of whom have locked out their union men, leaving The Western Process Engraving Co. as the only concern outside the protest. *The San Francisco Daily News* takes the side of the photo-engravers, who are supported by the Allied Printing Trades' Council, which has instituted a boycott by removing the union label from the newspapers engaged in the fight. Thereupon *The San Francisco Call*, alleging that the council's action was illegal and in violation of its constitution, has voluntarily resigned the use of the union label.

It is stated that the first conference of the I. P. E. U. officers, with President Woll in the chair, admitted that the stand taken by the employers was just, but (apparently because the employers' action had technically broken the union agreement) insisted on the signing of a new agreement, with a higher scale of wages, before allowing the men to return to work. The employers replied that they had, as a matter of fact, and quite voluntarily, been paying all the men at higher rates than were claimed by the new agreement, but refused to be forced into signing any new contract. Notice was then given by the unions to the jobbing engraving shops that their men would be withdrawn unless the shops guaranteed that they would make no blocks to be used in the offending papers. They replied that while they would refrain from knowingly doing work to be used in the journals in question, they could not control the blocks after they were made for independent customers. Therefore, as the desired guarantee was impossible, they locked out their men, rather than have them called out.

So the matter stood at the time of last communications before we went to press, the most hopeful item being a statement by the President of the San Francisco Allied Printing-Trades Council that, in his opinion, nothing in the dispute justifies a boycott, or cannot be settled "with credit to both parties, and the preservation of all rights of both the publishers and the members of the union."

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Carleton's Etching Process.

SPENCER CARLETON, of New York, claims patent for "improvements in producing etched surfaces, more particularly printing surfaces.

"The object is to produce, by an expeditious, inexpensive process, a very superior printing surface, the impressions from which are more faithfully true to the original than those produced by presents methods.

"While not confining the invention to the production of half-tones I will describe it as applied to such production, since thereby a clear understanding of the invention and its advantages may be had.

"The methods at present in use for producing half-tone plates are well known, and it is also well known that in the practice of such methods great expense is necessarily incurred, due to fine hand-work required to be applied to the originals, to the negatives and to the plates, to reproduce the original as faithfully as may be.

"The present methods of producing half-tone plates also usually involve the collodion process. This is relatively insensitive, and therefore slower in operation than the gelatine dry plate which I propose. Moreover, the wet collodion plate, whatever its exposure in the camera, fails to reproduce gradations of light and shade with delicacy approaching that of the dry plate.

"A further disadvantage lies in the use of a plate having a "coating," comprising asphalt, fats, waxes, silicates, gums, resins, sensitised glue, gelatine or the like, the use of some of which necessitates a baking step or 'burning in,' and in all cases the application of long and delicate manual treatment of the plate prior to, during, and after the etching. These steps, consequent to the use of said 'coatings,' involve not only time and expense, but also risk to final success. It may be added that the tendency of such 'coatings' to receive impressions imperfectly constitutes a continual source of failure in existing methods. Fidelity to the original, as well as quality and artistic merit of the engraving produced, suffer therefrom.

"One very objectionable feature of some etched plates is due to undercutting of the image. In this way some of the lines or dots may be entirely lost during the etching. In every instance they become roughened and uneven, thereby impairing the quality of the printing surface. When a dovetail is formed by the undercutting, perfect electrotype copies of such plates can be made only with great difficulty, if at all.

"To avoid these and other objectionable features, processes of to-day frequently have to resort to successive partial etchings. All this is time-consuming, troublesome, and not always successful.

"In half-tone plates by present processes dots are imperfect in outline, appearing rounded or irregular in section when intended to be square-shouldered. From this results a loss of 'color,' as it is termed, that is, a loss of fine gradations of light and shade, with less faithfulness to the original.

"The disadvantages enumerated are nearly, if not entirely, eliminated by my process and many new and important qualities gained for the final product.

"I will therefore concisely describe a satisfactory method of putting my process into practice. Equivalent or substitute methods or means will be mentioned further on.

"The first step in the practice of my invention as applied to half-tone engravings is to photograph the original, usually with the interposition of any suitable 'screen' or equivalent means. The sensitive plate will by preference be the usual dry plate.

"The second step of my process includes the preparation of the plate. I avoid the use of 'coatings' consisting of a substance or substances laid upon or applied to the surface of the plate but not an integral part of same. We substitute a substance or substances chemically incorporated with the surface of the plate; so united that the combination becomes a new substance; this latter by such union thereby acquiring sensitiveness to light. I print directly upon a metal surface rendered sensitive to the action of light. I first provide a metal plate, preferably copper, well cleaned, smooth and polished. This is then silver-plated by any of the usual plating processes, and is then thoroughly cleaned and polished preparatory to being sensitised. A convenient way to sensitise the metallic surface is to expose it face downwards to the vapor of iodine. The surface may be rendered more highly sensitive by subjecting it to the action of bromine (or its compounds) as well as to the iodine.

"To impress the image I tightly apply the negative against the sensitised metal surface and expose to light.

"The rendering of the image resistant to the etch and the development of the image, when required, is performed, preferably, with the use of mercury, the latter being in a small vessel and subjected to a suitable temperature and the plate being held face downwards over it.

"It is convenient, though not essential, to 'fix' the image by means of hyposulphite of soda or other suitable medium. Thus the tendency of the parts less acted upon by the light to resist the action of the etch is removed.

"The etching medium attacks the surface unprotected by the 'resist,' between the dots, until the plate bears the image in the form of projecting dots or studs, their tops coated thinly with mercury. Portions of the plate between the dots, but not under them, are eaten away; the etching is then continued to the desired depth.

"The etching may be expedited and improved by using a varying electric current, or by varying the direction of the current or by using an alternating current. Ordinarily after the etching has continued for a certain time, either with or without the current, and before proper depth has been attained, the process stops because of the formation on the plate of a substance which seems to resist the action of the etching medium. It is at this point that I vary the direction of the current, or if a current has not up to that time been used I apply the current in a direction reverse to the ordinary, making the plate the cathode, preferably with copper as an anode. The reverse current is continued for a short period and its effect is that the plate may be withdrawn from the bath and, after wiping (a feat which could not be performed without completely ruining the plate except for the action of the reverse current), the etching may be continued to a sufficient depth without hindrance. The wiping of the plate, as just hereinbefore referred to, is for the purpose of removing the formed substance from the surface of the plate. By this means the plate will be found to be very cleanly etched. The etching may be carried to the desired depth with entirely satisfactory results in the electrolytic bath with the plate as an anode in the presence of the current. I find it, however, convenient to obtain the deeper etching by removing the plate from the action of the current as soon as the unprotected portions have been completely penetrated. I then immerse the plate in an ordinary etching bath until etched to the desired extent.

"My process greatly simplifies and cheapens the cost of producing printing plates and engravings, and eliminates many of the steps which consume the greatest amount of time and labor.

"In the first place my process dispenses with most, if not all, of the hand work applied to the original, to the negative, and to the plate itself prior to, during, and after the etching, such as retouching, redeveloping, clearing, intensifying, fine-etching, tool engraving and burnishing, to which plates, especially half-tone, as at present manufactured, are necessarily subjected to obtain the best results.

"In accordance with the present invention it is perfectly practicable and highly desirable to use the dry plate, film or equivalent in the camera. The disadvantages in loss of 'color' and faithful reproduction of the original, resulting from the use of the slower and less sensitive collodion plate, have been mentioned. One of the great advantages of my invention therefore resides in the fact that in practice the dry plate, film, or equivalent may be utilised with entire convenience and satisfaction. A special convenience resulting from this advantage lies in its applicability to more direct reproductions. For this purpose a portable or any convenient camera, in connection with dry plates, films, or equivalent, and a 'screen' or its equivalent, may be used with perfect success to copy directly original objects, such as landscapes, living and natural objects, statuary and the like. The advantages of this short-cut are obvious. It is well known that every re-copying or transfer between the original subject and the final printing plate results in loss of 'color' and detail.

"I am well aware that in this art the use of a dry plate has been tried to some extent. My invention renders the use of the dry plate, film, or equivalent, not only a possibility, but gives superior results and is successful in regular practice.

"The mercury forms a perfect 'resist.' The lines, dots, or stipples are not undercut by the etching medium, but have clean, sharply defined edges, with side surfaces which incline outwardly and downwardly at each line, dot, or stipple. The intervening spaces form regular valleys, which may be etched as deeply as desired without any danger whatever of undercutting. This is a feature of the utmost importance.

"I have described the best method known to me for carrying my invention into effect for half-tone engravings, but I do not confine my invention to half-tone engravings, nor to the use of a copper plate as a base, nor to the employment of a silver surface on a copper or other plate, nor to any special means or methods of producing the sensitised metal surface and rendering the image resistant to the etching medium, since I believe I am the first to produce a relief 'disconnected printing surface' by means of a sensitised-metal surface for use in printing engravings.

"This process of directly sensitising a metal surface without the use of 'coatings' may readily be applied to curved or uneven surfaces, or otherwise as requirements may suggest. Hence it is peculiarly adaptable for rollers, cylinders, and other like devices; for the contributory plates or rollers used for embossing; for lithography; for wall paper and fabric printing; for 'three-color' and other color printing processes. For curved surfaces, films, 'stripped' or otherwise, are advantageous.

"The sensitised-metal surface may be used for the production of either intaglio, plane, or relief surfaces; particularly for relief half-tone printing plates. It may be applied to metal, glass, stone, earthenware, pottery, porcelain, wood, and other surfaces.

"The use of the sensitised-metal plate is equally serviceable for the reproduction of lines, full-tones, and any and all of the purposes of the art, replacing with advantage transfer and other existing methods in use for these purposes."

The "Scale," Price-Cutting, etc.

A WRITER in *The Inland Printer* makes some pertinent inquiries about prices and "cutting" in block-making, and concludes:—

"Conditions vary in every city and according to the statements of every man who has supported the new scale. Whether he is employer or employé, conditions vary on every job. Then how can any scale of prices be fair if you take seriously all these facts?

"It resolves itself into this one thing: that to run an engraving business successfully you must run it according to the conditions in themselves, irrespective of what your kind-hearted competitor says as he greets you with a smile, but all the time is thinking, 'What price is he going to give the Central University on those fifteen oval cuts?'

"The question is: Do you want to ride in an automobile and wear a fur-lined overcoat, or do you want to hand the keys over to the sheriff after two years of hard work?

"In our own territory we are high-priced, and our competitor who cuts us every time in price tells us of the fellow whose prices are putting him out of business.

"It's a conundrum. We all are price-cutters according to the other fellow, but according to ourselves there are no price-cutters!"

If the "scale" is insufficient, though it does make a higher price per inch for the work that is admittedly the most expensive,—the smaller sizes; how much more inefficient must the flat square-inch price be, which only makes the one difference of charging all blocks below a certain size at the "minimum" rate?

Cost-Keeping for Engravers.

By A. W. Rathbun; at the I.A.P.E. Convention.*

The subject assigned me by your secretary is so large and has so many different divisions that it is only possible to consider it in a general way at this time.

When an accounting system was suggested to the gentleman who opened up the engraving department for us, he doubted if such a thing could be attached to an engraving business. He had never known of it, and did not understand what there was to get the cost of, as he had always understood that if you paid out for labor, material, and expenses $4000 in a month and you sold $4500 worth of engravings you must be making $500, and that was the only accounting system he had ever heard of in engraving shops. What kind of work was most profitable, what work (if any) was done at a loss, what proportion of a job was labor, what proportion material and shop costs, what relation office and selling expenses bore to the finished product when it left the workrooms—all these were entirely unknown quantities.

The great aim of those employed in *selling* engravings seems to be, "Get the order." If the solicitor can not get it at what he considers the price should be, then take it at or below your competitor's price—but get it. If there is any question about a charge for extras on account of retouching, special outlining, etc., give the customer the benefit of the doubt, as otherwise you may lose the job. If the price is a little low, the solicitor knows that his house has no means of getting at the exact cost of the finished job, and it will help his total sales, upon the showing of which he expects a salary increase soon. It will also keep the shop busy; and even if the house should lose a little on this particular job, it will make it up on something else—is about the way the salesman reasons.

To get at the proper selling price, the first thing is to get the *cost price*, not what you *guess* it costs, but what *the figures show it costs.*

Your secretary flatters me by making the title of my subject "A Perfect Accounting System." The system we use is not perfect, but is the best one we have been able to find, and we are going to continue to use it until we can develop or find a better.

The headings of a system may be: labor, material, fixed shop charges, and office expenses. Productive labor can be charged against each job as it goes through the shop as one labor item, but we separate it as follows: Art, photo, printing, half-tone, line etching, and finishing. These can be arrived at accurately by using a daily time report for each workman, and transferring the figures to the job-tickets the next day. The troublesome item here is the matter of idle time, and the question we *must* determine is: "Should the price per hour charged on the job be increased over the amount paid to the workman to absorb unavoidable idle time (such as when a man is compelled to wait for a camera, or there is nothing for him to do); or should the charge on the ticket represent the exact amount paid the workman, and the idle time be absorbed in the percentage provided to cover cost of material and fixed charges?"

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* Mr. Rathbun is the Treasurer of the Inland-Walton Engraving Company, Chicago.

A portion of the material can be correctly measured and charged on each job, but there is a proportion which can not be so charged, particularly the chemicals, inks, etc. We have been figuring on a percentage to cover cost of materials in each department, together with the cost for fixed charges, which includes the proportion of superintendents', janitors', and boys' wages, also depreciation on equipment, insurance on equipment, and sundry minor expenses, including oil, repairs, etc.

Having charged the job with the labor that belongs to it, and added a percentage to equal the cost of material and other items, you have a total which represents the *shop cost only*. If it has been necessary to purchase items for a job, such as a drawing, or a photograph taken outside, or some printing, these should be added to the shop cost. Now you have an item which provokes much argument, and upon which there is a wide difference of opinion. It is "overhead expenses," comprising rent (also light, power, and heat, where same are not included in the rent), delivery charges, travellers, advertising, salaries of officers, office help, and incidental office expenses. The cost of the job as it leaves the workroom is *not* the cost of the job to your *firm*. Each piece of work *must* bear its proportion of these expenses. I believe the percentage plan must be used for a proper solution of this—that is, add to the shop cost of each job a percentage that will equal all of the above items. As a concrete example, let us suppose that the labor for a month in an engraving plant is $2000 and the material used $1000, making the shop costs on the month's work $3000; the rent, office salaries, and office expenses for the month are $750. This equals twenty-five per cent. of the shop cost of the product, and makes it necessary to add twenty-five per cent. to the shop cost of each job to find its total cost. For instance, a job upon which the shop cost was $40 would cost, with its proportion of office costs added, $50. Now add to the $50 what you think you should have as a profit for the risk of conducting a business, or, if you are doing business "just for fun," sell it at $50 or less.

Do not be misled by the idea that the percentages mentioned heretofore are items of profit, for, if correct, they are not, but represent actual outlay of cash, for which you must have a return on the goods you sell. First find your cost and then add your profit; and it might be added, that if you start out with the fixed idea that you must try to make a profit on each piece of work you handle, the sheriff will always have a stern chase.

As an example of the method of showing the costs by departments, I submit the two following examples:—

EXAMPLE I.—MINIMUM CUT.

Art Department:		
Labor	...	
Depreciation and general expense, per cent.	...	
Photo Department:		
Labor	$0.11	
Depreciation and general expense, 70 per cent.	.09	$0.20
Printing Department:		
Material	...	
Labor	.12	
Depreciation and general expense, 25 per cent.	.03	.15
Half-tone:		
Labor	...	
... per cent.	...	
Line Etcher:		
Labor	.08	
Depreciation and general expense, 55 per cent.	.04	.12
Finishers:		
Finishers' labor	.42	
Depreciation and general expense, 30 per cent.	.12	.54
Outside bills	...	...
Total labor and material		$1.01
Office sundries, 33⅓ per cent.		.33
Express		...
Car fare		...
General expense, 8 per cent.		.08
Commission and discount		...
		$1.42
Gain		...
Loss		.92
Amount of bill		$0.50

EXAMPLE II.—THREE HALF-TONES.

Art Department:		
Labor	...	
Depreciation and general expense, 20 per cent.	...	
Photo Department:		
Labor	$0.77	
Depreciation and general expense, 70 per cent.	.52	$1.29
Printing Department:		
Material	...	
Labor	.33	
Depreciation and general expense, 25 per cent	.08	.41
Half-tone:		
Labor	1.06	
Depreciation and general expense, 90 per cent.	.92	1.98
Line Etcher:		
Labor	...	
Depreciation and general expense, 55 per cent.	...	
Finishers:		
Finishers' labor	.73	
Depreciation and general expense, 30 per cent.	.22	.95
Outside bills		...
Total labor and material		$4.63
Office sundries, 33⅓ per cent.		1.54
Express		...
Car fare		...
General expense, 8 per cent.		.36
Commission and discount		...
		$6.53
Gain		4.57
Loss		....
Amount of bill		$11.10

Were it possible to turn out work for a month and then add all costs together, dividing them according to the amount of work delivered, before sending bills to your customer, percentages would not be needed, as actual figures would be at your command. As bills must be rendered promptly, however, we must be governed by our experience in past months for a basis in getting at the expense of producing work.

One thing we have proven conclusively, and that is, that under the minimum-cut idea, either a half-tone or a zinc, at the prevailing prices in our city—Chicago—is *always* a losing job, and especially when it is run singly. You can safely figure you are losing from one hundred to three hundred per cent. on each one you deliver to a customer.

In conclusion, one thing more, by way of caution: Do not attempt a cost-accounting system that is not a part of the general bookkeeping department of your establishment, for it must be treated as a part of your general ledger accounts to make it authentic and reliable.

The 'Frisco Strike and Lock-out: Latest.

WHILE the *P.E.M.* was on the printing-machines, and after the first sheets were printed, we received the news that the San Francisco trouble was amicably settled. The following brief statement of the case comes from Mr. Matthew Woll, President of the I.P.E.U.:—

"The original cause of difficulty dates back some numbers of months, at which time the 'Rouse Mounting Base,' intended to supplant the soft metal mounting used for mounting newspaper illustrations, was introduced. This new device, instead of being placed in the engraving room, was placed in the composing room, and members of our Union were deprived of the work of preparing these mounting blocks. Protest was made and a joint conference arranged between the I.T.U. and Local Photo-Engravers' Union to determine who should do the mounting of engravings on the Rouse Block. No adjustment was had, and the question was then referred to Mr. Lynch of the I.T.U. and your International President, who failed in arriving at a satisfactory settlement, Pres. Lynch contending that, while mounting engravings was part of photo-engravers' work, members of his union could do this work if employers saw fit to place these mounting blocks in the composing room. Your President could not agree to permit any part of our work being thus taken away from members of our Union, and so instructed Local Union No. 8, further instructing them to proceed at all times in a lawful manner, and not in violation of any agreements that we might have in force. On the *San Francisco Call*, where the issue first arose, the mounting blocks were placed in the composing room before protest was made; and in order not to violate our arbitration contracts, members were prohibited from taking any action which might be construed as a violation. Several weeks ago, the *San Francisco Examiner* introduced the Rouse Block, and placed this block in the engraving room, where it was being used successfully by our members. The blocks, however, did not remain long in our department, as the management ordered them placed in the composing room. This action was resented on part of our members, several conferences had, and arbitration suggested. Nothing came of this; and the men, because of insisting upon what they believed their rights guaranteed them by the National Arbitration Contracts, were discharged, in violation of this agreement. The trouble precipitated on the *San Francisco Examiner* spread immediately to other local papers, excepting the *Call*, and also to all commercial shops with a few exceptions, throwing out of employment sixty-five members of this Union. After a number of conferences with commercial shop employers, and after our members had been out for three weeks, a satisfactory agreement was entered into with the commercial shops, wherein commercial shop employers agreed to an absolute neutral position in our controversy with local newspaper publishers, and also to an increase of a flat minimum wage scale to $24.00 per week, to go into effect June 1st of next year.

"The controversy with local publishers was, at the time of my departure, not yet ended. Steps had been taken to enforce our rights in the use of the Allied Printing Trades Label, and all union labels were taken from the newspaper publishers with whom we were at difference. Steps had also been taken to obtain a boycott of one or more of the local papers—an action which unquestionably would have been successful, but happily avoided by a changed attitude on part of local publishers. This changed attitude can be best expressed by the following telegram received on the day of my return to Chicago:—

"'Matthew Woll: Publishers have made proposition to revoke order that caused trouble, and will make application to union for permission to use Rouse Blocks in same manner that *Call* is using them. All members to return to work under contract relations hitherto existing. Executive Board of number eight will unanimously recommend its acceptance by union. I also favor acceptance. What is your opinion? Wire immediately reply.—ANDREW J. GALLACHER.'

and my reply thereto:

"'Andrew J. Gallacher: Returned just in time to receive your welcome telegram regarding publishers' proposition. I favor and recommend its acceptance. I consider revoking of order having caused trouble by publishers a full and complete vindication of our contention, and a victory for the I.P.E.U.—MATTHEW WOLL.'"

"Tips" and "Wrinkles."

Payment is offered for brief practical notes and suggestions,—just those thousand-and-one little things that go to make work easier or more successful or more profitable.

Five shillings will be paid, on publication, for the most useful "tip" contributed in any month; and other payments of 5s., 2s. 6d., 2s., and 1s. are offered.

Every "tip" accepted will be paid for, and the payment will be governed by the apparent usefulness, *not* by the length. Three lines may be better than thirty.

***Rules.*—Write on one side of paper only. Each "tip" on a separate sheet or sheets, with the name and address of the sender, which will be published or not, as desired. Address to "Tips," c/o the Editor, *The Process Monthly*, 6 Farringdon Avenue, London, E.C.**

FISH-GLUE ENAMEL ON STEEL.—Be sure that the enamel is neutral or slightly alkaline, or its acid will attack the steel. Prepare the polished steel and free it from the last trace of grease by laying it for a few moments in clean benzine, then for a short time in a clean warm solution of potash. Dry thoroughly, go over the surface with fine charcoal, then treat as with any other metal. Etch with perchloride of iron, 40° Beaumé.—ED. CARLING.

MOUNTING THE METZOGRAPH SCREEN.—MM. H. Calmels and L. P. Clerc point out in *Le Procédé* that with the Metzograph screen there is a difficulty, at times, in getting the surface near enough to the sensitive plate. They therefore rebate the edge of the screen by grinding away a portion of the surface, as shewn in fig. 2.

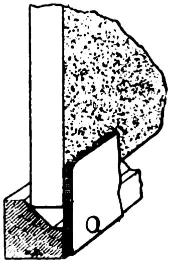


FIG. 1.

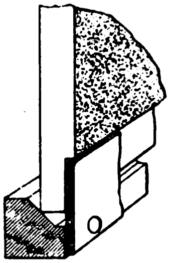


FIG. 2.

HALF-TONES FROM HALF-TONES WITHOUT MOIRÉ.—The only certain way is to copy the print, without any half-tone screen, exactly as if it was a line-drawing, and work it through as a fine line-zinco, not half-tone. In two particular sets of circumstances—namely, when the copy is to be reproduced same size, with a screen of the same pitch as in the original; or is to be enlarged or reduced in exactly the same proportion as the difference in pitch between the screen used for the original and the one used for the copy, half-tones can (theoretically) be made from half-tones by the cross-line screen method. To be successful, the camera must be set so that the screen lines of the original and those on the ground-glass coincide exactly, dot for dot. The centring must be accurate, and the parallelism between copy-board and plate must be exact. When these conditions are secured, if moiré still shows, it is only necessary to turn the screen very slowly (it should be in a circular holder) or to rotate the copy until the moiré disappears. When neither of these sets of conditions can be fulfilled, use a metzograph screen; or if that is impossible, make the best of a bad job by (*a*) working over the original as much as is allowable with wash color; (*b*) using a single-line screen, or a cross-line with a long slit diaphragm running in the same direction as one of the sets of lines; and (*c*) turning the screen to the position where the moiré is least offensive. If many such subjects have to be handled, it is a help to mark the copy-board with lines at right angles in the best positions for the lines of originals, to avoid moiré in the copies. This can be done by getting an assistant to lay a straight-edge across the centre of the copy-board, and turn it slowly until its edge is seen to coincide with one of the lines of the screen. Then from this set off angles of 45° on each side, and draw two lines at right angles. If the lines of any print to be copied are set parallel with these lines they will be at the most obtuse angle possible to the line (or lines) of the copying screen, which is the best position for avoiding moiré.—P. L. MARSHALL.

Business.

CLARKE ENGRAVING CO.—The petition of Walter Stuart Marchant, a creditor, for the winding-up of this company, was ordered to be heard before the Court on July 27th.

WRIGHT & LANGSTON have removed from 174 to 87–89 Edmund Street, Birmingham. Though they push their line and half-tone work, wood-engraving is still an important section of the business, which reaches its thirtieth anniversary this year.

Specimens and so forth.

FASHION STOCK-BLOCKS, a fine selection of autumn and winter fashion designs, of which electrotypes are supplied, has just been issued by The Art Reproduction Co., Plough Court, London, E.C.

PRINTING TRADE TERMS EXPLAINED.—The latest of these satirical blotters from The Arthur Cox Illustrating Co. takes the alphabet from "Ink" to "Linotype." Many of the paragraphs are very apt, as, for instance:—"*Linotype.*—An ingenious contraption, especially designed for setting up type and litigation."

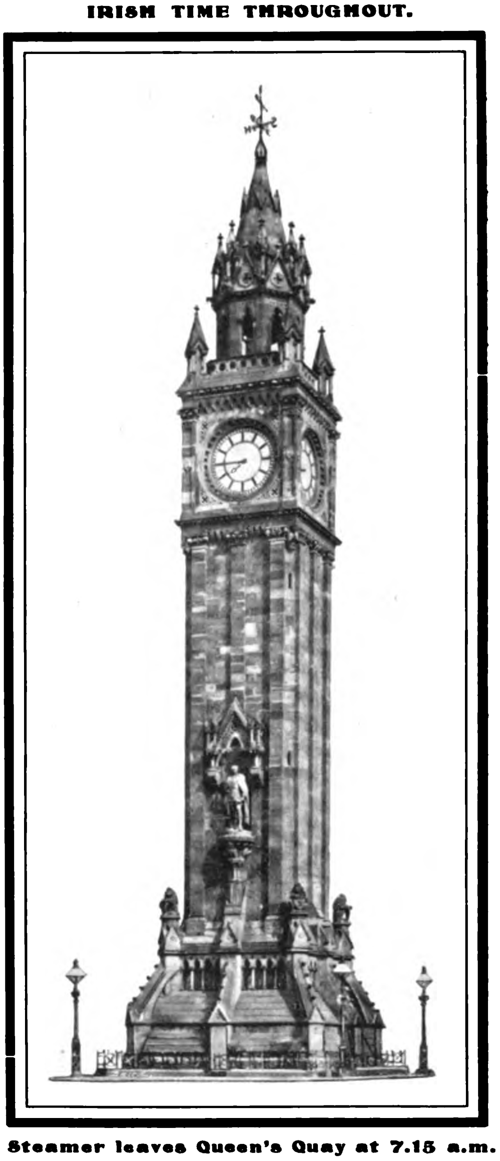
"THE DAILY CHRONICLE" of Georgetown, Demerara, has added to its other activities by the publication of an interesting series of local half-tone post cards. These not only include up-to-date views, but also some historically interesting reminiscences of Georgetown as it was in the middle of the last century.

THE COLOR AGE, a pamphlet of twenty-four large quarto pages and cover, is a sumptuous, dignified piece of advertisement, exemplifying the principle that the shoemaker's wife should not be badly shod. The text, by T. Leman Hare, is a well argued plea for the greater use of color-illustration, and both the text and the dozen fine color prints are printed from the Dalziel hard-metal stereos that the booklet is produced to advertise.

Brevities.

MACHINE ETCHING and the litigation thereanent has brought forward the patent of M. A. M. Truchelut, who took out a French patent No. 247,745 of May 28th, 1895, with additions on May 28th, 1896. This covers the use of an air-blast to drive the acid, the placing of the plate to be etched in any position, and the addition of "hard substances reduced to powder," for the purpose of removing scale, etc.

THE WAYZGOOSE, or annual excursion, of W. & G. Baird Ltd. and *The Belfast Evening Telegraph* was brought to an enormously successful issue on the 31st July, when over 500 employés chartered a well-equipped steamship, "The Vulture," and proceeded to enjoy them-


IRISH TIME THROUGHOUT.
Steamer leaves Queen's Quay at 7.15 a.m.

A "timely" notion. The front cover of the programme of the Wayzgoose of *The Belfast Evening Telegraph*. A bright idea of the half-tone department.

selves at Rothesay and the Kyles of Bute. Everything that could possibly add to the enjoyment seems to have been forthcoming, from glorious weather and calm sea to the gramophone and the cameras that were in evidence in great numbers for snapshooting the games on deck and the landscapes as the vessel neared and left the Irish and Scottish shores. Of course, the photo-mechanical crowd took its full share in the gaiety of the occasion, and more than its share in producing and illustrating the pocket guide which was issued to every member. An ingenious idea was the use of a clock-tower as the cover decoration, with the clock pointing on the front cover to the time at which the steamer left Queen's Quay, and on the back cover to the time at which it left Rothesay Pier. Both covers had the statement "Irish time throughout." Quite appropriately the morning view of the tower is fine-etched into a much greater brilliance than the evening one, but we note that the shadows of the statuary and other projecting parts are thrown in the same direction at 7.45 a.m. as they are at 4.30 p.m. Probably our ingenious Irish friends would tell us that these were views of different sides of the tower, but unfortunately they have left the weather vane on the top in both instances. The illustrations in the booklet consist of views of Queen's Bridge, Belfast; Black Head, the last point of Ireland; portraits of the managing directors, Mr. R. H. H. Baird, J.P., Captain Wm. Baird, and Mr. James M'Quitty; a view of Ailsa Craig or Paddy's Milestone, a realistic picture of Noah's ark facing one of "The Vulture," views of Holy Island Light, Port Bannatyne, Rothesay, the Piper on the boat, a local pleasure steamer, Inch Marnock, and a portrait of Mr. John Thomas Raubb, the oldest employé of the firm, who is now in his 79th year, and has been with W. & G. Baird since the establishment of the business as The Ulster Printing Co. in 1852. Amongst other items the booklet contains what is called a "Tabloid History" of the firm, which now has close upon 600 employés, and the only adverse criticism we have to make is to remind the writer of the history that he does not give the date at which the firm took up process engraving, a most momentous step in its successful career.

THE TENTH ANNUAL CONVENTION of the International Photo-engravers' Union is to open at Milwaukee on September 7th. A report on a scheme of technical education, and discussion of regulations for hygiene and shop-sanitation, are the chief subjects for the Convention.

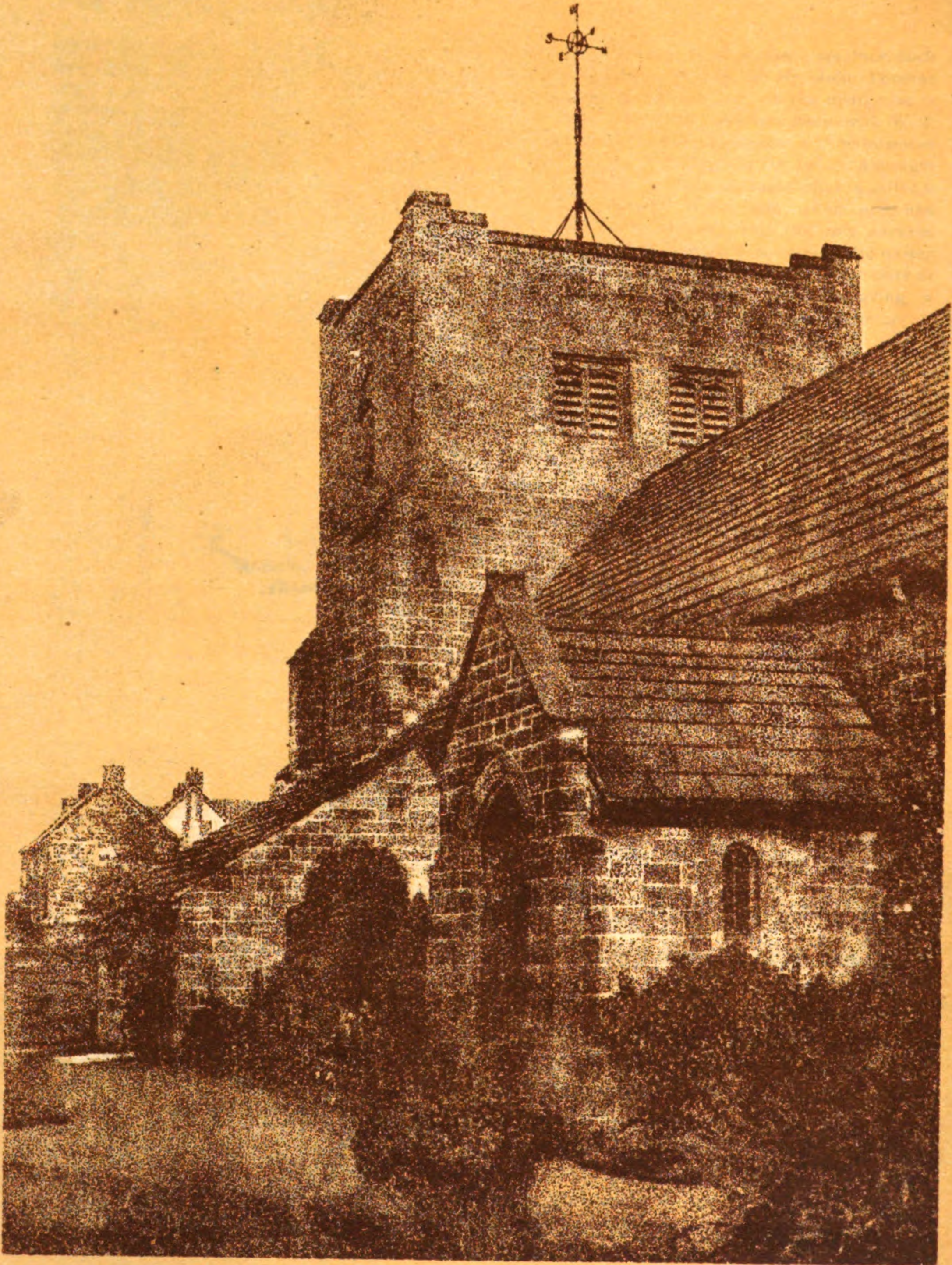
THE HOLT ETCHING MACHINE, which was described in our issue of June last, is proving very satisfactory in actual work, and has an output of about 2000 square inches of copper half-tone per day. It is being used for all grades of half-tone work, and also for very fine line work.

THE NEW HOME OF JOHN SWAIN & SON LTD. is a fine corner building in Shoe Lane, facing the junction of that street with St. Andrew Street, St. Bride Street, and Stonecutter Street. It is a modern building of many floors, and a little army of men is at work at the time of writing, adapting it for the requirements of an up-to-date process house.

Important.

The next issue of this magazine will be mainly devoted to photo-lithographic matter. No factor in the recent development of photo-processes has been so important and far-reaching, or promises such revolutionary results, as the application of photo-mechanical methods to lithographic printing. Within the next few years lithography will either be a most valuable field for the "process" man, or it will be his most serious competitor. We wish to see the new methods developed so far as possible along the lines of co-operation between the "process" man and the lithographer, not along lines of competition. Our next issue will be an effort in this direction, and we shall be glad to send a specimen copy to any lithographer who is not a reader already. Will our present readers send us addresses; also any suggestions for increasing the usefulness of this special issue?

THE
JOHN CRERAR
LIBRARY.



Example of Metzograph Photo-Lithography.
Coarse Grain No. 0.

Albumen Print from continuous-tone negative.
The work has been re-transferred.

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
ENGRAVER'S
MONTHLY
THE PROCESS PHOTOGRAM
ESTABLISHED JAN 1894

VOL. XVI. No. 190.
OCTOBER 1909.

Founded and Edited by H. SNOWDEN WARD, F.R.P.S., Editor of *The Photographic Monthly.*

The Future of "Process" and of "Litho."

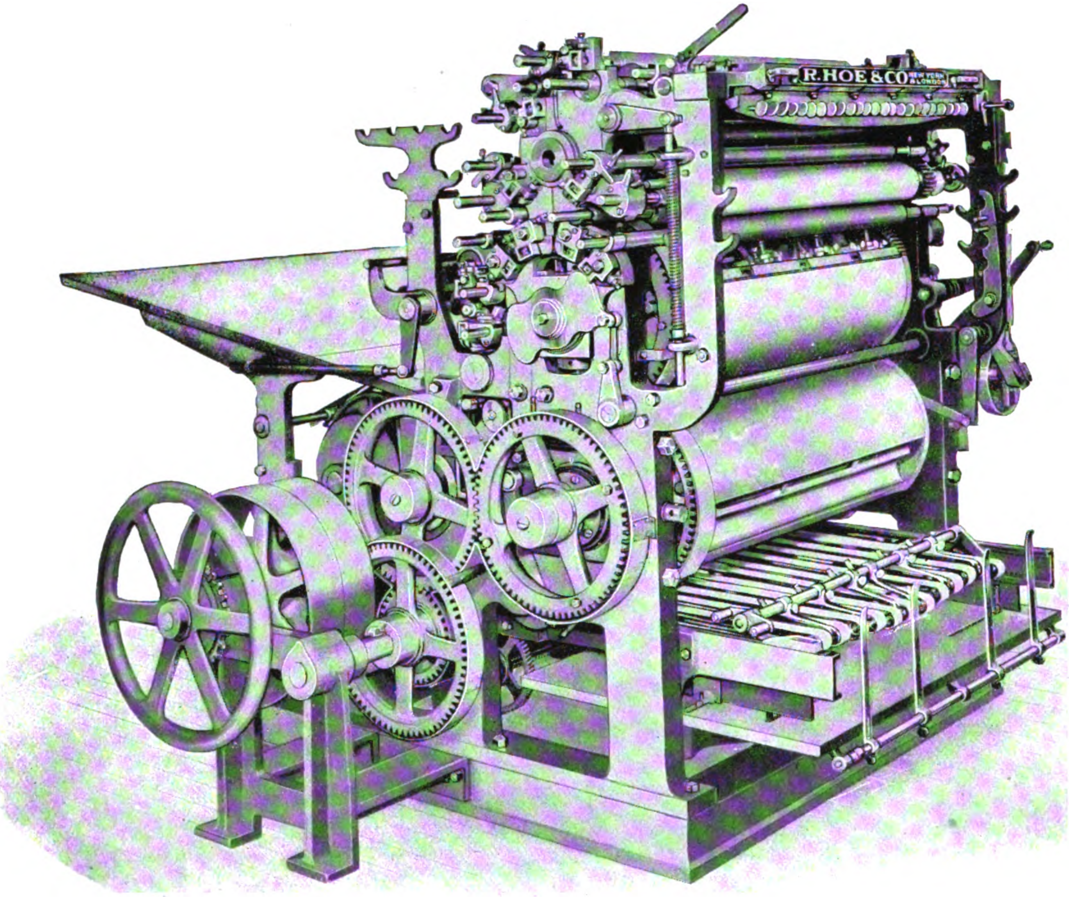
For many years the letterpress side of photo-mechanical work has been increasing rapidly and steadily, "taking the food out of the mouth" of many a lithographer. While it was confined to black-and-white work the stone-printer did not mind very much, but consoled himself that the field of color was all his own, and perhaps he benefited to a certain extent from the growing appreciation of pictures which led to increased demand for his work.

Even the facsim. color-reproduction processes of collotype and photogravure did not trouble the lithographer much, for although they gave more perfect results than he could obtain, they were expensive and slow at best, uncertain and unsatisfactory at their worst.

The rapid perfecting and cheapening of the trichrome half-tone process has made a very material difference to the lithographer; and when it began to supply the large colored supplements for some of the great popular Christmas Numbers of the magazines the serious nature of its competition grew clear.

About the same time, however, two things happened which enabled the lithographer to take over the very same methods that had made the letterpress printer's new-found success, and to compete at every point of quality and cheapness, with the further advantage of some qualities that the letterpress man can not equal. The introduction of improved photolitho methods, simultaneously with the growing use of metallic printing surfaces in place of stone, was the first step. The second was the perfecting of the rotary offset press, which not only quickens and cheapens production, but also opens new and great possibilities in the way of very fine printing upon relatively coarse paper. In this last-mentioned direction letterpress cannot, and probably never will, compete satisfactorily, a fact which means enormous increase in the use of color-lithography for book-illustration, for commercial work, probably for magazine printing, and possibly for the printing of newspapers.

The facts are so clear, and the impending changes are so important, that it seems a duty to direct the attention of our readers to them. The attitude of the photo-engraver toward the changing conditions needs careful consideration. Either he must work with the lithographer, supplying him with transfers just as the letterpress printer is supplied with blocks, or the lithographers all over the country will develop their own photo-mechanical departments. From the lithographer's point of view there are advantages in each direction. It is convenient, of course, to have the photographic department under one's own roof, but a staff and outfit to deal with color-work as well as monochrome must be expensive, and can hardly be justified except in very large businesses. The special knowledge that is used for making color-blocks in half-tone is, in the main, the same as is needed for photolitho transfers, and the process man, with



The "Hoe" Rotary Offset Press; typical of the new form of press which is doing much to revolutionise lithography, and to enable it to compete in many new fields with letterpress.

his large staff and multifarious experiences, becomes a highly-trained specialist with organised advantages, against whom the small "shop" studio, with its one or two cameras, can not compete in either cost or quality. Probably the number of firms doing their own photolitho work will increase for some time, but eventually they are likely to follow the example of many letterpress printers who installed process plants a few years ago, but who have now shut them down and returned to the specialist photo-engraver.

To Lithographers.

This issue will fall into the hands of many of you who are not regular readers of *The Process Monthly*. Every issue contains more or less matter dealing with the litho side of "process," and if you are interested in photolitho possibilities you are invited to subscribe. For the sum of six shillings per annum the magazine will be sent post free for one year. The cost is the same as if it is bought month by month from the news-man, and in addition to assured prompt delivery there are certain occasional supplements which are sent to subscribers only. The subscription (6s. inland, 8s. abroad) may be sent direct to the publishers, or through a news-agent, who will receive his usual commission, though the sending will be by post.

("The Process Photogram.") October 1909

Reproduction of Pencil Drawings in Half-tone and Litho.

By L. Villemaire.

Translated from *Le Procédé*; to the proprietors of which we are indebted for the use of the illustrations.

GENERAL processes based on the same principle are excellent for this method of reproduction. I have during three years studied and several times used two which I will call the direct and indirect processes.

What especially affects half-tone is the direct or high-light process. This is how I work in using this process for reproduction from a black-lead or crayon drawing impossible to reproduce in line. I generally use for this work a very fine screen 200 lines to the inch (80 lines to the centimetre). The instrument is supplied with a Cooke process lens 30 × 40, of 46 cm. focus, which easily gives all the details of the original.

Nothing is changed in the usual method of preparation and sensitising the wet collodion plate; the only modifications are in the distance of the screen and the size of the diaphragms, the copy being illumined by two enclosed arc lamps of about 15 ampères each with a continuous current of 110 volts. These lamps being, for a drawing about 18 × 24 to reproduce in the same size, placed at 35 cm. from the subject, separated from each other by about 90 centimetres, I give a first exposure of from 75 to 90 seconds with a round iris diaphragm $f/22$, the screen being distant 9 millimetres from the sensitive plate (3 millimetres of thickness of protecting glass for the plate used, and 6 millimetres of distance recorded on the scale of the screen-holder). This exposure, during which the screen is almost entirely eliminated because of the distance, is intended to cover the negative entirely with the pure whites of the subject.

The screen is, for the following exposure, placed at 6 millimetres total distance (comprising in it the thickness of the glass of the screen) and the lens furnished with a square diaphragm of 9 millimetres with notches on the side (No. 8 of the series of Cooke diaphragms for black half-tone). After 2½ minutes' exposure with this diaphragm the subject is covered with white paper and an exposure of 1 minute given with the round diaphragm $f/96$.

Development is conducted exactly as usual, but with this difference, however, that we should allow the developer to act for some time on the plate, the iron and copper giving the best results when this has yielded its full effect. The development is continued with nitrate of silver and pyro before fixation.

The reduction of the negative can be done with acid permanganate, being careful, however, to watch the action of the bath in order that it should only attack the parts reproduced in half-tone without acting on the high-lights where the dots are intentionally fogged.

Strengthening the negative is obligatory in all cases, and is done by immersion in a ferricyanide of lead bath, followed by washing in acid water and darkening in sulphite of sodium.

In order that a negative with high-lights should give a perfect result it should present the appearance of fig. 1, that is to say, with no dots visible in the lights of the subject, having a character very

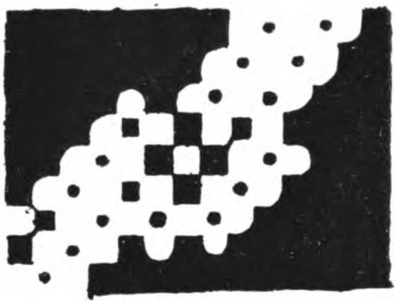


Fig. 1.

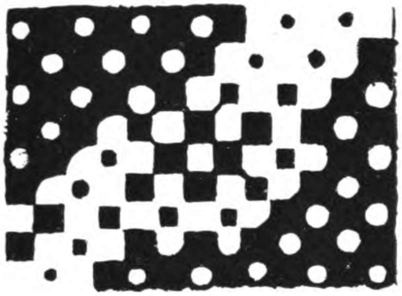


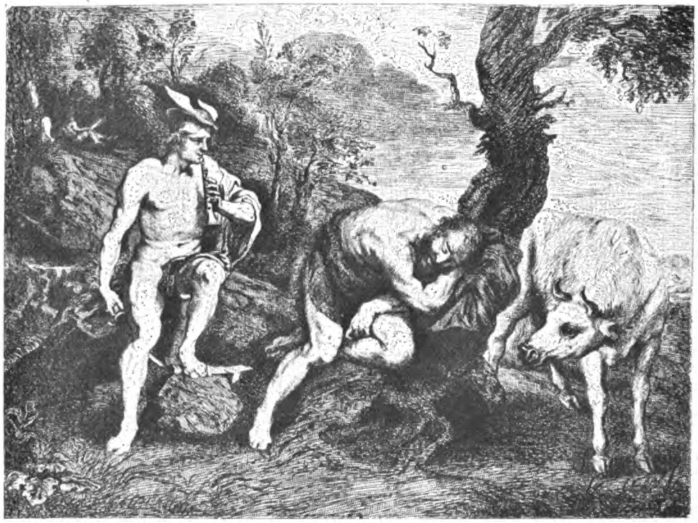
Fig. 2.

different from that of a negative of a half-tone executed from the same subject (fig. 2) in the usual manner.

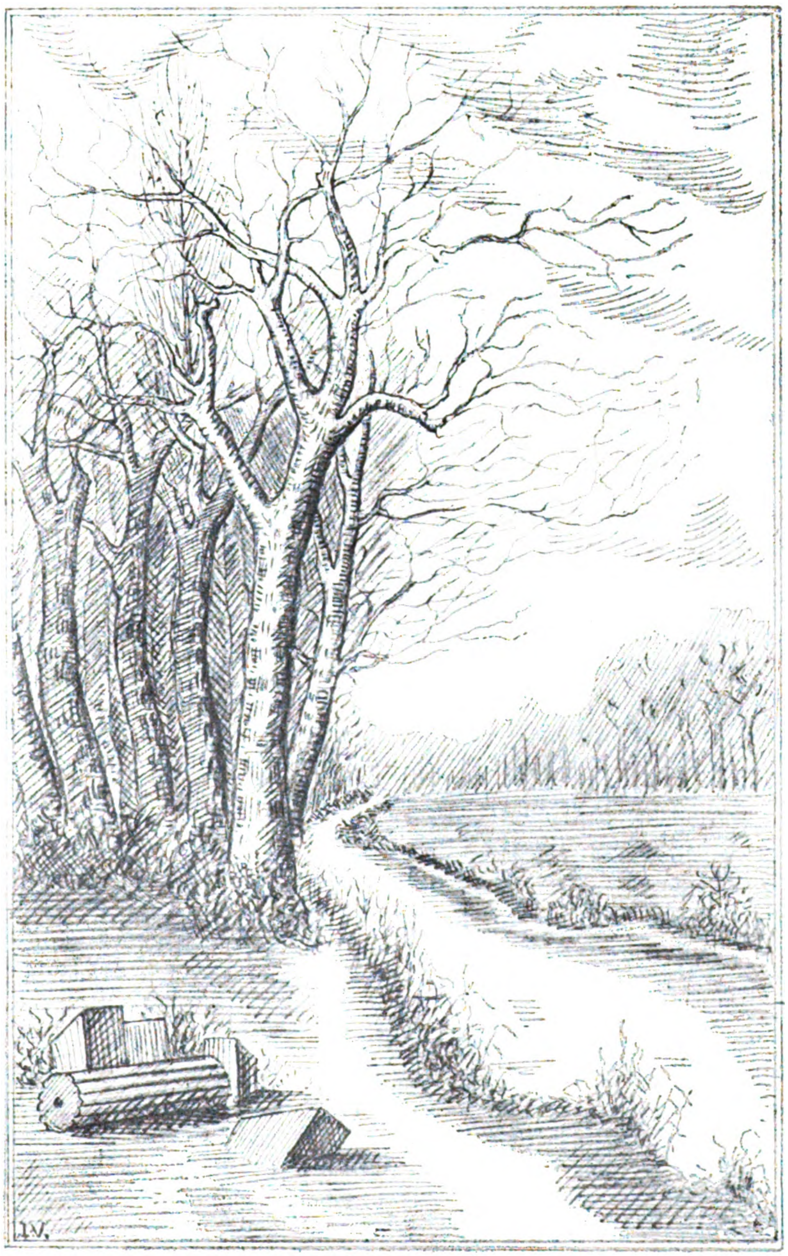
The printing process which with this kind of negative gave me the best results is that of inked albumen with a slightly longer printing than usual. Note that a simple development of the print followed prematurely by inking would spread the dots in the deep half-tones and build up the small useless dots, which would completely destroy the desired effect.

In printing from these facsimile blocks it is well to choose an ink showing as nearly as possible the appearance of the original.

Although also usable for half-tone, the process I will call "indirect" is especially suitable for lithography. Instead of proceeding as above we first make from the copy an ordinary negative (not screened), either gelatino-bromide or collodion; from this negative we make by transmitted light a high-light half-tone positive which, engraved into grained zinc, will be transferred (for example) on aluminium by the usual lithographic methods. Without my efforts in this path being sufficiently advanced to finish in categorical fashion, I consider these methods would be perfectly applicable to chromo-lithography. The original polychrome, pastel, water-color or painting should be first copied by three negatives; from these should be made three positives, and from these three high-light negatives with the suitable screen inclination for each. The three negatives, exposed to light on aluminium or zinc and transferred to aluminium, would allow three-color printing rapidly on very ordinary papers by means of a rotatory litho machine.



An antique engraving reproduced by the high-light process.



Reproduction of a lead pencil sketch by the high-light process.

✓ Indirect Big Screen Negatives for Lithography.

By H. Van Beek.

THE subject of big screen negatives is not a new one. Even in the early days of screen experimenting, we can register the first serious attempts to adopt this mechanical screen effect on the stone of the lithographer. Of course the results were very poor indeed. Technique develops gradually. The process which will be described in the following lines tends to simplify the making of big screen negatives, rendering unprofitable the work with big screens which are costly, and seldom of the qualities wanted for good work. Such a thing as a screen of 30 x 40 inches can safely rest in its box, where the risk of breakage is less great. The process is an indirect one, and makes use of the high qualities of a good fish-glue print. It has proved to be most satisfactory in several big premises, and merits therefore to be given for the general benefit. In short, the work settles down to the following:—

Make a negative on reduced scale, of course with a fine screen. Let this negative be of high quality; print on a selected glass plate, with enamel or Penrose's Tonno, a very good copy which represents a first-class positive. This positive, dyed in the suitable way, is enlarged to the size which is wanted, and the negative stripped, to be printed directly on stone.

Perhaps a lot of operators need no more than this extractum to secure a good result. However, it may be safe to go into the difficulties of the details, which should be well mastered, to ensure a high-class print on the stone. The first big advantage of such an indirect process is that you can pay all your attention to the qualities of a moderate-sized negative, and —during enlarging—you may secure the best sharpness with a small stop. This saves considerable time and labor. Moreover, in this case every good enlarging lens with correct design will do. The direct big screen process, on the contrary, asks a very costly optical outfit. It will be superfluous to relate the choice of the screen for the original negative. If, for instance, your optical outfit does not allow an enlargement of threefold the original, you cannot push the reduction too far. For instance, a 30 x 70-inch picture, given an enlarging power of our installation of $2\frac{1}{2}$ times the original, would ask a negative of 12 x 16 inches and a screen of 150 square inches. Let this negative be first class, the shadow dot very fine. To ensure a smart and vigorous effect, cut away the shadow dot in the deepest shadow—if allowed. Big pictures are not looked upon at such distances as to show a lost dot. The highlight should just be closed up. Exaggerating, the contrast has the bad consequence of much more loss of value than in blockmaking, where you can stop out.

The intensifying should be done with lead. This intensifier secures the truest rendering of the scale—it is much cheaper in use, quicker. Have care to work on selected flat glass.

This original negative, floated with gum solution and dried, should be printed on fish glue or Tonno.

The glue film, whirled on glass, should have a good resist and be very thin. For these reasons we prefer Tonno. If you work with fish glue, do not forget a little quantity of albumen, which gives a more firm and solid film. Take 325 parts water, 9 bichromate-ammonia, 125 fish glue, 50 albumen. Before whirling, have your glass well degreased with gum-arabic solution.

Avoid too much heating, a very common fault. After drying, back the glass plate with a black cloth, and give twice the printing time you would give on metal. After printing, cool well your glass print and develop in the common way. Dye it and rub, where necessary, with cotton; or cleanse the print with a discreet application of warm water. Be sure that all glue which ought be washed out has really disappeared.

The violet print on glass can very easily be examined, and is now brought in the lead intensifier of the photographer. Apparently you do not see much effect. Let your plate lie ten minutes in this bath, which hardens the film, and should gradually take the place of the water.

Wash superficially, and blacken with sulphide of ammonia. The common monosulphide of potass would also do, only it is too alkaline in the concentration, which is necessary to act quickly. Still better it is to blacken with any acid or neutral solution. The sulphide of ammonia, however, does very well, if sufficiently diluted. After this blackening, the picture is brown colored. Put again in the lead and blacken again. The print resists very well rubbing with cotton. Your print on glass is now of a heavy black—very sharp, full of tone, and with all the high qualities we are accustomed to find in the metal print ready for the etching tub. Dry the positive without heat and fix black paper strips around to cut off all that should not be reproduced on the enlargement. Of course your enlargement outfit should be rigid and well up; your lens be free of astigmatism, otherwise you have in the corner of the print oval-shaped dots.

Stop down what you want. The camera and positive holder should be rigidly fixed on *one* stand to avoid every dislocation.

A ground-glass behind the positive and the whole system alighted with reflected sky light. Give full exposure. Otherwise every small scratch on the glass of the positive will reproduce on your big negative. The making of the negative does not ask particular attention.

Do not forget to bring in account the shrinking of the film in stripping. The stripped film is generally $\frac{1}{50}$th of its size too small.

The stripping, also, is often badly done. In many shops the rubber collodion stripping is the only method known. However, such a film is very smooth, elastic, and very tender. Squeezed with vaseline oil on the plate, you will seldom find that a square remains perfectly a square. After one print the film becomes very bad. Therefore, such a photo-litho film is often coated on both sides. All this loss of time and material can be avoided if you substitute the collodion with celluloid varnish of following make:—

Clear celluloid - -	40 grams.
Acetone - - -	1800 cms.
Amyl acetate - -	200 ,,
Castor oil - - -	6 drops.

The rubber and celluloid are alternately only twice poured on the plate. After drying, you pass with a knife around and strip down. Such a film is handled with the aid of transparent thin paper, rubbed smoothly with some drops of thinned vaseline oil. The film adheres sufficiently, and is well conserved.

The celluloid film is tougher by far, not so elastic and tender. It is by no means spoiled by the oil, necessary in squeezing. You can make half a dozen prints of such a thin film without any spoiling.

The adhesive on the stone is 50 parts benzine, 2 vaseline oil. Spread some drops of it on the stone, do the same on your film, then place the film, adhering on the transparent paper, and rub gently with a smooth squeeze or roller till all air bubble has disappeared.

After printing, cleanse the stone with pads damped with benzene, and roll up the developing ink.

Science and Money in Photo-engraving.

A Lecture by N. S. Amstutz, at the I.A.P.E. Congress.

(Concluded from p. 202.)

NON-DELIVERY UNLESS INVOICE SHOWS PROFIT.

It should be scientifically understood and practically carried into effect that not a single job be delivered unless there is at least a definite net gain attached to the invoice, then we should hear no more about unprofitable business.

When in Paris a few years ago I had some mechanical work done, and was impressed with the scientific manner in which the different items of the invoice were rendered.

After giving the itemised hours, workmen's names, prices per hour, totals for each and a sum total of all these charges, amounting to 52 francs, there was added a charge called "Frais Genereaux 100 per cent.," meaning "liberal expense" of another 52 francs. Then there came non-productive labor charges—administrative—of 7 francs 10 centimes, and an item for materials amounting to 50 centimes, making the base of the bill 104 francs, which, including the last items, rose to 111 francs and 60 centimes. In addition to all this there was added under the name of "benefice, 10 per cent.," premium, 11 francs 15 centimes, making a total of 122 francs and 75 centimes. As indicative of the practice in this kind of work in Paris it will be well to briefly analyse the totals. Productive labor represented 42·3 per cent., administrative charges 5·8 per cent., "liberal expense" 42·2 per cent., materials ·4 per cent., and "benefice" 9·2 per cent. of the whole.

Is not a part of the present-day troubles due to a false commercial modesty that shrinks from letting the customer know that a profit is made on his work?

Another phase of this branch of the business needs serious attention. It is the dominance of the solicitor (commercial traveller). How can any house progress satisfactorily when the solicitor is witness, jury, and judge all in one? The unintelligent solicitor too frequently whistles the tune to which employers and employés dance, taking work at a figure below a rival, simply to show volume of business, regardless of profits. An intelligent solicitor who knows the limitations of the various processes and who is conscientious enough to refuse unprofitable work is a veritable gold mine to a house; but why permit the price setting and the cost ascertaining factor of the business to become a perambulating authority? Why not take the more scientific method of charging each job on its own merits, regardless of the square inch or any other arbitrary basis? There would then be an intelligent procedure, every one knowing where he stood. By compiling the data, it would be seen in time just what the square inch relation was and if its use as a basis of estimate is desirable.

In general industrial economics it is currently considered that separate handlings fix the larger part of the cost of production. In this connection there seems to be a lead in the direction of fixing a piece charge, regardless of the size, for no doubt it would be found that the law of averages would come into play to equalise the slight differences between a large block and a small one. A job that has fifty separate cuts represents more work than if there were only twenty-five having the same aggregate area. Suppose, then, that a fixed piece charge be made regardless of all other items, to which should be added the labor cost doubled, materials, office expenses, overhead charges, etc., allowing the piece rate to be the "benefice."

If all work could be grouped on a camera copyboard, grouped on the metal, etched flat, mounted on a common base, and delivered *en bloc*, letting the various customers that are represented do their own dividing and sorting out, one would save keeping Mr. Day-before Yesterday's work separate from Mr. Know-it-all Cheapbuyer.

EXTRA COMPENSATION FOR RUSH WORK.

Rush work should also come in for extra compensation. It is manifestly unjust for the whole plant to work at high pressure either to meet an indiscreet promise or the self-assurance of a solicitor who wants his specials gotten out ahead of the house regulars. In any case through such urgency extra energy is used, and according to a fundamental law of science that nothing can be procured without the use of time, materials, or money, it is illogical to expect an increase of the energy output without a proportionate increase in cost.

Why use up the power of the place, the energy of the men, for high pressure jobs without receiving extra pay? Too frequently the results produced under such conditions are anything but a credit to all concerned. Why, then, persist in the perpetuation of a custom that means dissatisfaction to all?

Since there is enough work to go around, why waste valuable time in such questionable activities?

THE ART ELEMENT.

Fortunately it is coming to be recognised that the art element is largely associated with the production of engravings. This will automatically remove much of the work from the hurry-burry class.

The science that appertains specifically to the art department is of a slightly different order, but one finds the same distinguishing characteristics wherever order is in vogue instead of disorder. The principal scientific features requiring attention here are the reproductive susceptibilities of the various photographic tones, the simulated photo-water-color-tints and the reproductive values of colored sketches designed for three-color reproduction. It should be a regular procedure in all art departments to have a series of tests showing the various conditions mentioned, including the reproductive values of various brands of Chinese white. There is also the use of scientific enlarging and reducing devices and the systematic use of shading mediums, etc.

Information of the greatest possible value can be secured in a comparatively short time if the various features mentioned are carried into effect in such a way that a record of the variations, as well as the conditions that have no variants, are noted down in a book set aside for the purpose, because paper is cheaper than brain-memory and more susceptible to perpetuation, with the smallest possible outlay of directive energy, leaving the mind free for larger and more important duties.

SCIENCE AND PRECISION.

In the photographic line and half-tone etching, mounting, and proving departments the greatest possible amount of science is needed, because the day when "the rule of thumb" dominated everything is past, never to return again. There seems to be a misconception as to the skill required to master these departments of reproduction; some holding that other craftsmen in nearly related trades are of a higher order than those that have to do with engraving.

On the orderly procedure of all the technical steps in the work—a scientific method—will depend the greater part of the earning power of the business, thus again linking up "Science and Money."

The craft is awakening to the necessity of greater precision and definiteness, so that a more uniform quality of work can be regularly secured and the "make-overs," "come-backs," and chemical wastes are practically eliminated. No other craft has such unbounded possibilities of success or failure. Too much of the latter has been the lot of many energetic and conscientious proprietors, but an absence of scientific procedure has made all the hard labor involved worse than useless. Now is the time to turn out the traditional and take up alert and wideawake practices. It augurs well for the business that there is so much activity among progressive employers and employés looking to the inauguration of greater technical proficiency throughout the craft.

Metzograph Photolithography.

By R. B. Fishenden.

With two supplements facing pp. 217 and 232.

PHOTOLITHOGRAPHY may be used in various ways for the production of lithographic printing surfaces in half-tone, but the methods do not appear to have received the attention which their importance demands. Whilst for line subjects the ordinary commercial photolitho transfer is widely used, for subjects in gradated tone there is no accepted process.

There are a number of historical processes, such as that introduced by Asser, for the making of grain transfers, and also the modification of Husband's papyrotint process, which is still producing excellent results under the name of "ink photos" by a few firms making a specialty of the work. The process, however, depends on the reticulation of bichromated gelatine for the formation of the grain, and any method which depends for its success on the actual physical condition of gelatine will always be liable to irregularities because of the variable nature of the material employed. A process based on purely optical conditions is to be preferred because of its greater uniformity, and for this reason the "half-tone" process has now reached a high degree of mechanical perfection.

Direct photolithography in half-tone was dealt with in a recent article in this journal,[*] but there are other methods in use at the present time which do not appear to have attained wide popularity. This is to be regretted, because the lithographer would frequently obtain orders in competition with the letterpress printer, if he had at his command a suitable economical process where hand-drawing could be eliminated in favor of mechanical reproduction.

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[*] "Direct Photolithography in Half-tone and Tri-color"; May issue, p. 117.

The process to be described is a simple one, capable of being used not only for ordinary black and white subjects, but more especially as the basis for the work of the chromo-lithographer, as it will be seen that the grain lends itself admirably to the purpose. The results are obtained by preparing an ordinary dry-plate or wet-collodion negative, and printing from this on to a sensitive surface, placing in front of the negative a metzograph screen. The effect, under certain conditions, is to break up the print into a grain which is easy to print lithographically. This grain may be coarse or fine, depending on the fineness of the screen used; and the prints may be re-transferred without any difficulty by a competent lithographic printer.

The negative for the purpose, as has been said, should be in continuous tone, but it requires to be specially made, because negatives as ordinarily prepared are too strong in contrast; it should be very "soft" and delicate, and free from fog—if there should be any general veil the exposure is increased to a considerable extent. A wet-collodion negative intensified slightly by the " re-development " method will be correct, or a correctly exposed dry-plate negative developed for two-thirds the normal time for P.O.P. printing will be satisfactory.

The thickness of the negative glass is a matter of some importance. If it is a dry-plate negative the glass is usually of the necessary thickness, but wet-collodion negatives must be made on selected thin glass, as it will be found that the use of even the thinnest plate glass will result in a very coarse grain in the print.

If printing direct on to metal plates for direct printing or re-transferring, a reversed negative should be made, or, for printing on to photolitho transfer paper, a direct negative is necessary.

For printing on to zinc or aluminium plates the metal should be prepared as for bichromated albumen printing, graining the metal rather more than for ordinary work. A printing frame with a fairly strong spring pressure is required, but the glass bed must be quite free from any scratches or marks, because these show prominently in the work. The metzograph screen is placed on the bed of the frame with the rough surface uppermost; on this the negative with the film to the top, and on the negative is laid the sensitised metal; the pressure is applied, and the plate is ready for the exposure. If the printing is to be done by artificial light, an open type arc lamp should be used, *without a reflector*, and the printing-frame placed at a distance of two feet from it, and an exposure of from fifteen to forty minutes given according to the character of the negative. It is of the utmost importance that (1) the frame is not moved during the exposure; (2) no light other than that from the one arc lamp reaches the frame; (3) the frame is not placed nearer than the distance given. The exposure may also be made to direct sunlight, but *diffused* daylight is entirely unsatisfactory; for sunlight printing, a special device is necessary to shut out the remainder of the light, because only the parallel rays are to be used. The Wheeler metzograph printing box is a convenient piece of apparatus for the purpose, although it is possible to improvise a temporary arrangement. The box must be inclined so that the surface of the frame is at right angles to the direction of the light, and it must not be moved during the exposure. The exposure to sunlight is shorter than when an arc lamp is used, and it will vary from one and a half to five minutes. As to the manner in which the grain is produced, the screen has a surface of a lenticular character, which refracts the parallel pencils of light and causes it to form a grained print, but the grain becomes scattered if diffused light is used, and it is for this reason that either direct sunlight or an artificial light, where the area of the illuminant is small (such as an open type arc lamp), must be adopted for the exposure.

After the exposure the plate is rolled up with a thin layer of re-transfer ink thinned with coal tar naphtha. Turpentine may be used for thinning the ink, but it makes the development somewhat more difficult if any portions require modification. The plate is allowed to remain in the water for a few minutes before the development is commenced, and then should be kept under water until the work is well advanced; if the plate is removed and any drops of water are allowed to collect on the surface uneven markings will result; when the plate is nearly developed it may be taken from the water, and any parts which should be lighter may be easily reduced by local rubbing with the wet cotton-wool, whilst any portions to be entirely removed are cleaned with soft willow charcoal. At this stage a print may be worked upon to be used for chromo work and afterwards completed by the chromo artist; if all the colors of a chromo job are prepared in this way, a very considerable economy will be effected over the usual method of working entirely on offsets.

When the print is completed it is dried, and to make the work thoroughly strong is dusted over with bitumen powder and heated on the gas stove until the bitumen is glazed, after which the plate is given a lithographic "etch" to remove the scum which is liable to appear as a result of the last operation. The plate is now put under gum and handed to the litho printer.

Photolitho transfer paper may also be used as was mentioned in the early portion of this article, and treated in the ordinary manner; but better results will be obtained by taking a single transfer paper as used in the carbon process and sensitising it by floating on a solution of bichromated albumen four times the strength used for coating the metal plates, and after drying, using it in the ordinary manner.

The screens most suitable for the work are the coarser grades, No. 1, especially for ordinary work, and the coarser ones recently introduced, Nos. 0 and 00, for large subjects and posters.

The accompanying illustrations are intended to show the suitability of the grain for coarse work in large sizes. The method has already been adopted for chromolithography by several large firms in America.

("The Process Photogram.") October 1909

What "Process" owes to "Litho."

Most present - day lithographic printers seem to be quite unconscious of the fact that it was through lithography that the most important photo process methods of to-day obtained their first principles and borrowed their earliest manipulative methods.

The "ruled-line screen" of the photo-engraver was, in its first introduction, but a complete copy of the old time lithographer's "ruled-line copper plate," from which he used to pull transfers and then transfer these lines to a gummed-out image, previously drawn upon the stone, a second transfer being always pulled, and then transferred at right angles across the previous ruling. Thus was obtained a screen image, more or less perfect, according to the "gumming-out" and the success of the transferring operations involved.

Sometimes a second gumming-out was resorted to, and additional ruled-line transfers run down on the ungummed parts of the image; thus producing the initial forerunner effect, which has more recently been imitated by the triple and quadruple-line screen of the photo-process engravers.

Printer students and the older school of process workers will remember that the first ruled screen employed in their craft was a single-line one, similar to the plate lines as used by the lithographers nearly a century ago; the cross-line effect being produced by turning the screen round to a right angle for the other half of the exposure and the complete production of the half-tone effect.

Whilst there still exists to-day some lithographic firms who yet practise the ruled copperplate method, it is in the main displaced by direct screen negative work on stone and metal plate on the one hand, and by the "shading medium films" on the other; some of these latter giving a most realistic screen dot effect, akin to the result produced by the ruled screen.

Apart from the fact also that copper plates were the metallic printing medium used in lithography, before process proper had evolved, zinc plates also were employed by the lithographer as a printing surface, long years before they were purloined by the latter-day process engraving trade. In fact Senefelder used zinc plates as a printing surface in lithography in the year 1806.

But this is only a mere cipher part of the many forms of modern photo-process engraving methods, which owe their existence and success to the pioneer creations first ushered into the printing world by the lithographer.

It is not generally known that "three-color chromo-prints" were efficiently done by the lithographer as far back as 1856. Those who will take the trouble may verify this fact, although perhaps attention has not been drawn to it before in photo-process technical journals; due, probably, to the pervading desire for latest possibilities, observing most other factors of information along these interesting historical lines. The work referred to was a reproduction on stone of a fresco by Michael Angelo, and printed by J. Aresti (chromo lithographer to the Queen). It was done to show the effect of the three primary colors, printed over each other, in a subdued manner. It is also worth noting that in the same publication efforts were made at so early a period to procure three granulations on figure subjects for monochrome work.

Even the "irregular grain metzograph screen effect" was produced in lithography by means of the sensitive asphaltum, used both on litho-stone and zinc plates a quarter of a century before the metzograph glass screen; so that the old art and craft of lithography evolved modern conditions of photo-process work.

Then, again, take "line engraving" on zinc; present day method of the "passing bath," and of the "nitric acid and alum solution etcher" of the line block-maker, as well as the protecting method of "dusting-in" the work or image with an acid resist, either resin, or asphaltum, or French chalk: all this is absolutely taken "holus-bolus" from the lithographic printer, who has used the method on both zinc and stone for over a century.

Even the rolling-up after the first etch in photo-engraving is yet done with a litho-nap roller; the rolling-up process itself being unquestionably a lithographic one, as the gumming-up was invented by Senefelder in the year 1798, and practised uninterruptedly up to the present day, the action being a chemical as well as a mechanical one.

Further, it is a most signal fact that all the earliest fine-etchers in three-color block-making, etc., were chromo-lithographers, as are also the best to-day: whilst those who are not litho-craftsmen have invariably been trained under the guidance of these craftsmen.

Very much more could be adduced under this same category, but I submit this as a gentle reminder that the process trade of to-day owes more to the lithographer than he has ever had time to realise in the hustling condition of his daily avocation.

✓ *New Things in Gelatine and in Electrolysis: The Dodge Patents.*

Notes by John Highgate.

THESE two things may not upon the instant seem to have very natural connection. They are connected, first, in that the same ingenious brain (that of Mr. Ozias Dodge of Norwich, Connecticut) is responsible for patents in both matters. Mr. Dodge is a *rara avis.* He is an artist first and last and all the time, and indirectly he directs an establishment in the States which provides artistic instruction of a special character on a considerable scale. Withal he is one of the men who, once possessed of a notion, must see it materialise.

> "The keen spirit
> Seizes the instant means, the present hour;
> Plans and prepares, performs and executes."

The execution in this case has been a long process; for it has involved countless experiments in all departments of the graphic arts. What he particularly essayed to effect was the reproduction of the artist's finest touches with the minimum of loss. For that the requirements were, first, the ideal surface for drawing upon; next, the ideal method for reproducing the drawing.

He offers what he regards as the ideal surface in the Norwich film. It is a gelatine sheet, differing from gelatine sheets previously on the market in that it is translucent and has a grained surface. The earlier sheets have been smooth, and more or less opaque. The new films are grained chiefly by contact with grained glass; that grain being finer or coarser to suit different requirements. The sheet is fibreless, is colorless, and has a slightly tacky or adhesive character which just suits the pencil. Moreover, erasures are easy.

These qualities make it understandable that the American market should have absorbed 20,000 of these sheets in the first year of the patent's operation. One gathers that very large users have been artists on newspaper staffs. They have found the sheets very serviceable for drawings to be reproduced in facsimile size. It has to be remembered that the American weekly newspaper is a prodigious magazine whose reading matter, to say nothing of its abundant illustrations, should suffice to occupy the reader through the six intervening week days without any time being available for his business or other affairs. The facsimile drawings for these papers are often about 18 x 10 or larger size. Etchers, lithographers, designers, architects and mechanical draughtsmen, are others who stand to benefit by the "films." Whoever the worker may be, he has the advantage that when he "flows" with collodion the sheet bearing his drawing, its translucency becomes quite transparent and the drawing becomes "fixed."

Mr. Dodge decided, as Prof. Herkomer earlier essayed, to grow an electro from his drawing, without first making an original half-tone plate, and particularly he seems to prefer to grow an intaglio electro. (He finds that in delicacy and faithfulness of preserving the slighest touch of the drawing there is nothing to equal this method.) He cleanses the copper plate, and while it is wet, with cold water, coats it with the following solution:—Albumen from fresh eggs, 2½ ounces; water, 1 ounce; chloride of sodium, ⅓ ounce.

The plate is then coated with a solution of—Le Page's liquid glue, 2 ounces; double chromate of potassium and ammonia, 70 grains; ferrocyanide of potassium, 4 grains; water, 3 ounces.

For putting on the first solution the plate is made perfectly clean and wet with cold water. It is then whirled. The solution is poured on and drawn off at one corner, then poured on again and drawn off at the opposite corner, and the plate then whirled, slowly at first, until there is a thin film, nearly dry. In the same manner solution No. 2 is placed on the plate and the plate whirled, till it is dry, over a gentle heat. The plate thus sensitised may be kept three or four days in the dark room, growing more sensitive the longer it is kept.

If a relief plate is desired, then a transparent negative is taken, and the sensitised plate and the negative are placed face to face in the printing frame. The exposure is in dry sunlight from one to three minutes, and four to six minutes if electric light is used. The copper plate is then placed in a bath of eosine, which gives it a bright color and allows the development of the picture to be watched. The image will rapidly appear under running water; the picture will be grown in proportion to the amount of light received. If the negative was a half-tone, the grain will vary according to protection afforded by that negative. The plate is washed till the copper is clean in the deep shadows, and is then flowed with wood alcohol and burnt off, and then held under a strong heat, 380° F., until the picture turns a dark brown. It is now insoluble in proportion to the negative protection. Then comes a roughening of the surface of the plate so that the copper deposited in the bath may adhere firmly. A weak chromic acid etching accomplishes this. Margins and other parts that are to appear white may be painted over with asphaltum varnish, and then the plate placed in the electric bath. The copper will be built up on the exposed surface of the plate. As the electric deposition proceeds the coating of the varying solubilities will come away, in grains, in the same proportion, and their place will be supplied by copper. For the coating of the plate is insoluble in the proportion of the amount of light that has permeated the negative. Therefore the plate will vary in height and size of grain from the highest flat surface, which will print black, to the lowest point of the original surface of the copper, which will remain white. When the plate comes from the bath it is cleaned in boiling water and lye, and is ready for printing in the ordinary press.

If an intaglio plate is desired, the process is the same, save that a transparent positive is used. If a pen and ink or other black and white original is to be treated, the following solution is used instead of those previously named:—Albumen, 2½ ounces; Le Page's liquid glue, 2 ounces; bichromate of ammonia, 70 ounces; ammonia, 7 drops.

The plate is coated in the manner before described. A transparent positive is now used instead of a negative. Print and develop as before. The copper plate after cleansing will be exposed where the black lines of the positive occurred, and in the electrolytic bath copper will be deposited upon those lines, thus making a relief printing plate.

Instead of this method of producing a design upon a plate he might photograph upon the plate direct.

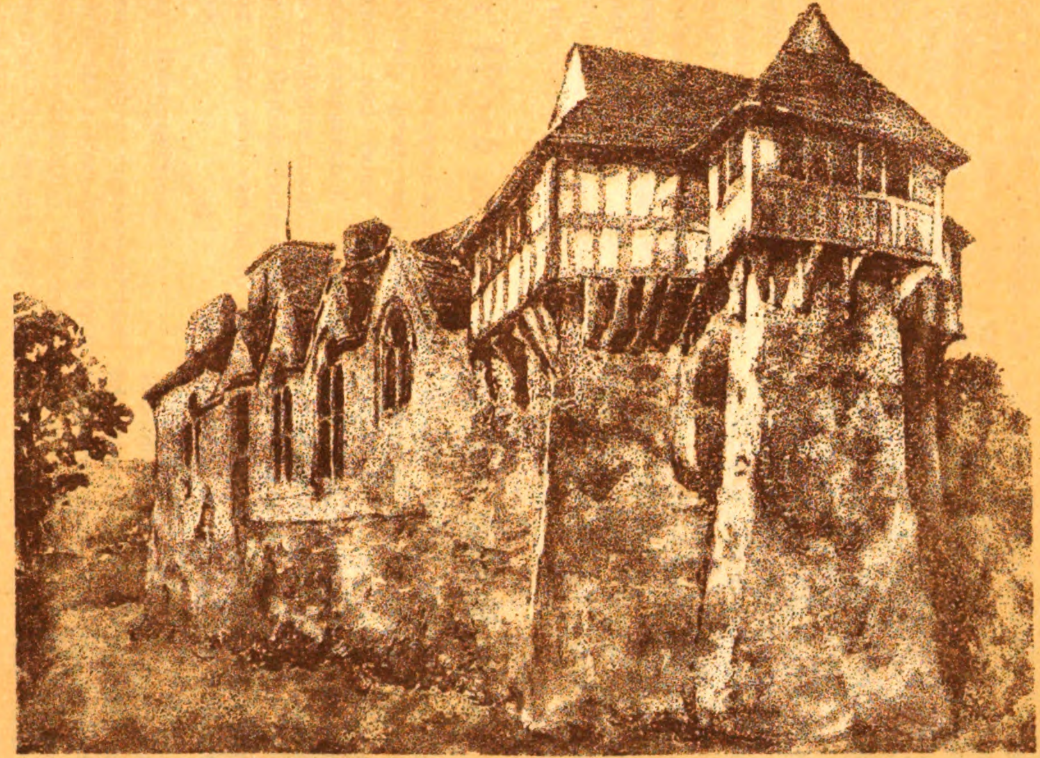
For a relief plate Mr. Dodge prepares the copper plate as previously described. After drying, the plate is coated with a solution of benzine and pure rubber, and is flowed and whirled until dried, when the surface bears a transparent film, insoluble in water. This surface then receives a coating of gelatine bromide emulsion containing—Potassium iodide, 3 grains; potassium bromide, 8·7 grains; nitrate of silver, 11·4 grains; gelatine, 18 grains; water and ether as required.

The plate is slightly warmed and the emulsion poured on. It is then dried with a slow steady heat in the dark room. Plates thus prepared are of an even creamy white color, and will keep indefinitely in a dry atmosphere. The speed of the plate may be as high as in dry plates. Upon the plate so prepared the picture can be taken in the ordinary camera. The plate is developed in a variety of ways with alkaline or ferrous oxalate developer, the object being to develop a negative with transparent whites.

Fix with a weak solution of ferricyanide of potassium or hyposulphate of soda. The plate is thoroughly washed and dried to the extent of removing surface water. The moist plate is exposed to sunlight for one and a half minutes, or to electric light for about seven minutes. The plate is placed in a tray of warm water about 100° F., and the film is removed.

It may be preserved as a negative by placing it flat on a suitable glass support. A bath of benzine then dissolves the rubber coating and leaves the first coating ready to be developed in cold water. You develop as before. The result is a relief plate in half-tone suitable for printing in ordinary press.

Mr. Dodge makes a plate on which a picture may be directly photographed by another method. He etches a copper plate in solution of chlorate of potash, 20 parts; hydrochloric acid, 100 parts; water, ·880 parts. You wash in warm water and place in an electrolytic bath of silver. The plate on being taken from the bath should show a grained surface under the glass. The silver surface is then covered



Example of Metzograph Photo-Lithography.
Coarse Grain No. 1.

Albumen Print from continuous-tone negative.
The work has been re-transferred.

with silver bromo iodide. It becomes exceedingly sensitive to light. Powdered iodine is then spread on the bottom of a box and a piece of cardboard is placed over the iodine. The iodine will volatilise upon the cardboard. The cardboard is turned over and the silver plate is placed up above it at a distance of one and a half inches, the silvered surface of the plate facing the side of the cardboard which was exposed to the iodine. The plate will gradually receive a thin coating of iodine and the color will change. It should be taken out before it begins to turn grey. The plate is then placed in a box, in the bottom of which there is a mixture of bromin and calcium hydrate. The surface iodide becomes brom-iodide, and the color becomes steel grey and violet. The plate should be taken out and again subjected to the action of iodine as heretofore for about one-third the original time. The plate is now ready, and is very sensitive to light. It serves for instantaneous work. In developing the plate it is placed in a wooden box or frame face downwards over an iron tray in which has been placed a thin layer of mercury. The temperature is now raised to 150° F. The vapor of the mercury converts the parts acted on by the light into an amalgam of mercury, while the parts unaffected by light remain iodide of silver.

The plate having reached the right stage when the highest lights are perfectly white, is at once placed in an electrolytic bath. The copper will deposit upon the amalgam or mercury, while the iodide will remain unaffected. When the plate is sufficiently built up it is cleaned, and the result is an intaglio grown plate suitable for printing.

Process Work at the Dresden Exhibition.

Though much has been written about this truly great exhibition, its interest and value have been nowise exaggerated. It seems impossible to exaggerate them. There is still time for our British readers to visit the show, and those who can do so will be fully repaid.

Real Reproduction.

The outstanding photo-mechanical fact is the triumph of the surface-printing and intaglio processes—photolitho, collotype, and photogravure — as means for the facsimile reproduction of colored pictures. The fidelity of some of this work is so great, its texture is so wonderfully rendered, that one of the judges (himself a photo-mechanical worker) absolutely refused to believe that certain brush-mark effects were not obtained by embossing. Even with a good magnifier, examining the picture through the glass that covered it, he was still deceived, until the picture was unhung and examined upside down, when the wrong incidence of the shadows was evident.

Writing of the Austrian Exhibition in London, we praised the facsimile reproductions very highly. In the Dresden Exhibition, where the same reproducers have the advantages of hanging in a house specially built, lighted, decorated and managed by their national government, the work is perhaps even more striking. Angerer & Göschl and the Imperial Royal Academy and Laboratory in Vienna (Dr. Eder's school), both *hors concours*, have much marvellous work, but the most interesting of all is the color collotype, and the color-photogravure of Blechinger & Leykauf, Vienna. They are most closely pressed by J. Löwy, of Vienna, and it is impossible to place either firm before the other. Probably the five absolutely greatest facsimile reproductions in the whole exhibition are from Blechinger, but Löwy excels in number and variety of subjects, and his reproduction is triumphantly fine. Other firms receiving the *Ehrenpreis* (prize of honor) for the same class of work are Husnik & Hausler (Prague), Max Jaffé (Vienna), Paulussen & Co. (Vienna), and Albert Frisch (Berlin). Though all these firms show wonderful work, the only one that absolutely challenges the supremacy of Blechinger and of Löwy is Frisch, whose collection, filling a whole wall, is remarkable. While the Austrians show both ancient and modern work, Frisch confines himself to the glorious old masters in which the German galleries are so rich. So far as practicable they are reproduced in the exact size of the originals, and are finished with frames that are also facsimiles of those in the galleries. Famous religious subjects and great portraits are reproduced so faultlessly that for all practical purposes of study and inspiration they are just as valuable as the originals.

THE PRIZES.

In addition to the firms above mentioned, the following exhibitors received the prize of honor: — Reichsdruckerei (Berlin); Dr. Albert (Munich); N.S. Amstütz (Valparaiso, Ind.) for original contributions to photo-mechanical knowledge; Rockstroh & Schneider (Heidenau); the Miehle Printing Press Co. (Berlin), and Albert & Co. (Frankenthal), for machinery; Brend'amour, Simhart & Co., Munich; Franz Hanfstaengl, Munich; Rudolf Schuster, Berlin; Karl Krause, Leipzig; and the collective exhibits of Swiss lithographers. *State medals* were given to Falz & Werner and to Hoh & Hahne, both of Leipzig, for cameras and miscellaneous apparatus; and *City medals* to Meisenbach, Riffarth & Co., Berlin, and to J. Hamböck, Munich.

The list of the *Gold Medallists* is as follows:—Vereinigung der Kunstfreunde, Berlin; Georg Büxenstein, Berlin; Schelter & Giesecke, Leipzig; Förster & Borries, Zwickau; E. T. Gleitsmann, Dresden; A. Hogenfrost, Leipzig; Bemrose & Son, Derby and London; C. Hentschel, London; A. W. Elson, Boston; O. Felsing, Berlin; Dietz & Listing, Leipzig; A. Krampolek, Vienna; Alfiere & Lacroix, Milan; Golicke & Willborg, Petersburg; Gesellschaft f. graph. Industrie, Vienna; F. Jasper, Vienna; Dr. Trenkler & Co., Leipzig; Unie, Prague; A. Ruckenbrod, Berlin; L. Angerer, Berlin; Kunstanstalt Wilh. Hoffmann, A.-G., Dresden; Stengel & Co., A.-G., Dresden.

Silver Medals were awarded to:—Sinsel & Co., Oetzsch-Leipzig; Krey & Sommerlad, Dresden; Nenke & Ostermaier, Dresden; Martin Rommel & Co., Stuttgart; J. B. Obernetter, Munich; Deutsche Photogravüre, A.-G., Sieburg-Cologne; G. Heuer & Kirmse, Berlin W.; Republican Publishing Co., Hamilton, U.S.A.; Nordisk Reproduktionsanstalt, Copenhagen; Taylor Bros., Leeds, England; Vaus & Crampton, London; Western Morning News Co., Plymouth; Christiania Kennigrafiske-Anst., Christiania; Cederquist's Grafiska Aktiebolag, Stockholm; Graphische Union Rein Schreiber, Anton Hub, Wilh. Schäfer, Vienna; Dent & Co., London; Pawson & Brailsford, Sheffield; Press Etching Co., London; Prokodine-Gorsky, St. Petersburg; L. Lagrelius & Westphal, Stockholm; Patzelt & Co., Vienna; George Alpers, jun., Hanover; Julius Fröbus, Cologne; H. Haufler & Co., Stuttgart; Huch & Co., Brunswick;

Ch. Hostmann - Steinbergsche Farbenfabrik, Celle; H. Wunder, Berlin; Binner-Wells Company, Chicago; Eclipse Electro and Engraving Co., Cleveland; Gisevius Bogdan, Berlin.

THE EXHIBITS.

The whole photo-mechanical section (with the exception of the Austrian Exhibitions mentioned above) is arranged in one great reproductions hall by the Buchgewerbeverein of Leipzig, which has gone to an enormous amount of trouble to give a worthy representation of the reproduction crafts. In the centre of the building is a great hall with heavy machinery, some of which is in motion, while side halls contain the apparatus both for the production and the printing of various photo-mechanical surfaces, including a large Miehle machine and a quantity of printing and embossing machinery by Rockstroh & Schneider. The rest of the great hall is made into a long series of salons in which the results of the various photo-mechanical processes are displayed with a great deal of attention to the arranging, framing, and lighting, so that the collections in general, and the individual prints in particular, all show well and can hardly fail to receive due attention.

BRITISH AND AMERICAN.

The British and American exhibits are very distinctly below the standard that might have been expected from these great photo-mechanical countries, a fact that we believe to be due to misunderstanding of the real aims and scope of the exhibition, and also to insufficient time for the preparation of proper display. While much of the work is very good, it is not, generally speaking, arranged so effectively as is that of the Germans, for little attention seems to have been paid to effective ensemble. The committee of judges was much interested in the work from the English-speaking countries, and their awards erred, if at all, in the direction of being too many rather than too few.

ORDINARY HALF-TONE.

While almost every other section of work is of a very high order, the black and white half-tone includes a large proportion that is very disappointing. Even the exhibits from some of the largest firms with world-wide reputation include many examples that are quite ordinary, and some that can hardly be called good. One would think that the selecting and grouping of the black and white specimens had been left in many cases to some junior in the business, who had gathered them quite perfunctorily from the proof-drawers, and certainly many of the firms must have better specimens, even amongst their everyday work.

OVER-ELABORATION.

Perhaps the most unsatisfactory section in the whole show is the catalogue-illustration after what is called by some of the exhibitors "the American method." In nearly all cases the removing of the backgrounds and the working up of the originals have reduced machinery illustration to pictures which completely misrepresent the texture, and in some cases the construction of the machines. Iron castings made to look like worked ebonite, wood that looks like smooth cardboard, and steel rods that resemble nothing so much as the glass tubes of steam gauges, all attest the over-enthusiasm of the retoucher of originals, and suggest that in this department at any rate a reduction of the amount of labor can be made with advantage.

The judges in the photo-mechanical section were:—*President*, Georg Fritz, of the Imperial State Printing Works, Vienna (author of *Photo-Lithography*); *Secretary*, H. I. Burger, head of the Polygraphisches Institute, Zurich; Dr. E. Goldberg, of the Technical Institute, Leipzig; Howard Spencer Levy, of Philadelphia, Pa.; Prof. Dr. Luther, of Dresden, and H. Snowden Ward, of London. The extent of the exhibits may be gathered from the fact that the judges were hard at work for long hours from the morning of Monday until the middle of Thursday afternoon.

The jury on scientific photography awarded, in its undersection of literature, a number of plaquettes for publications of photo-mechanical interest. These were to Klimsch & Co., Robert Voigtländers Verlag, Henry Greenwood & Co., Joseph Meadon (Graphic Arts Year Book), A. W. Penrose & Co., Ltd. (*The Penrose Annual*) and the Inland Printer Co. Dawbarn & Ward, Ltd., were included in the list but placed *hors concours* through the presence of one of their directors on the grand jury.

Line Sketches direct upon Photographic Prints.

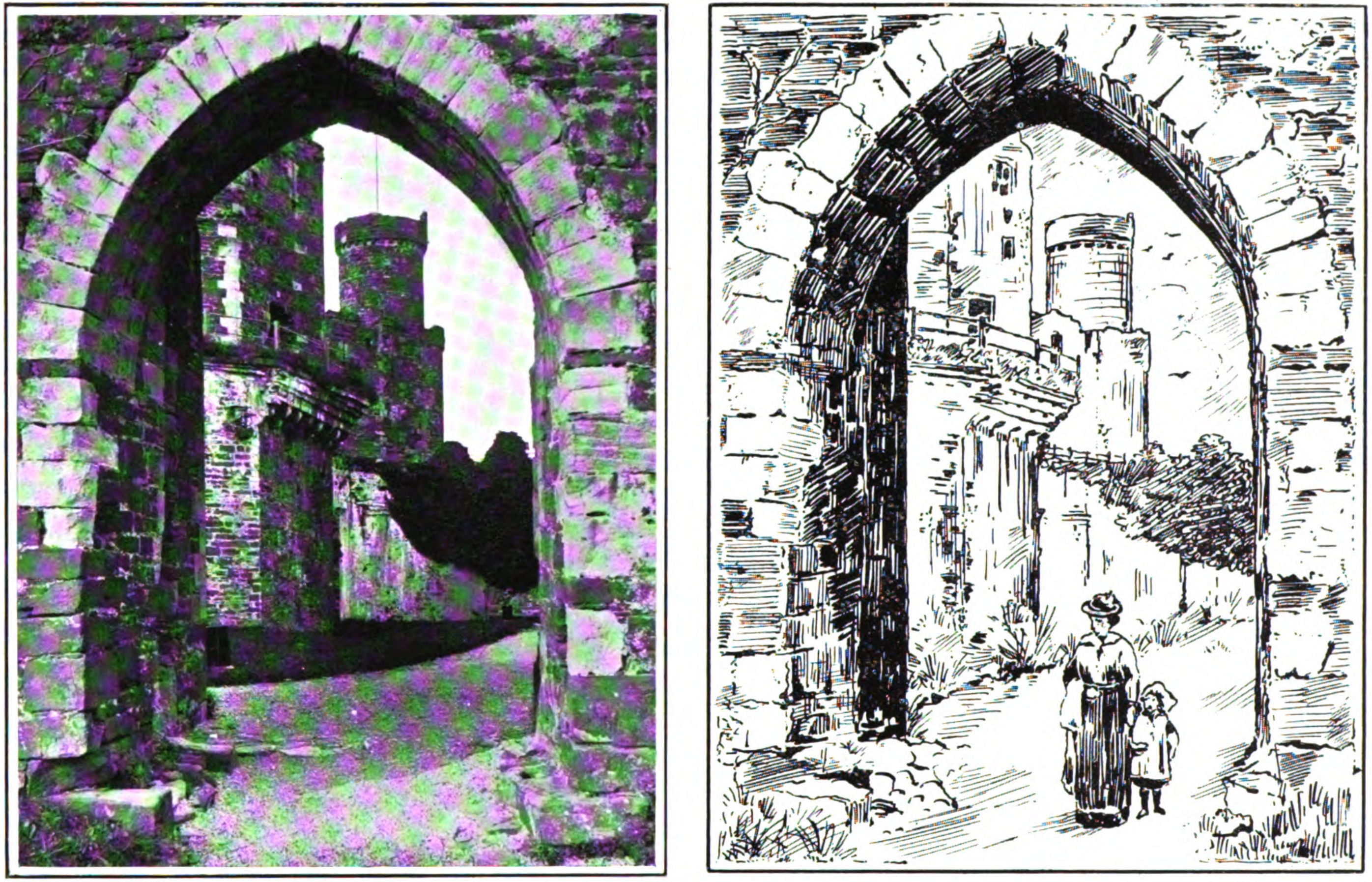
By Ernest W. Jackson.

An old method that is still unknown to some and that is not used so largely as it might be. The hints are for mere beginners.

A MEANS of making pleasing and effective pen-and-ink sketches from photograms will be found useful where a simple and easily made drawing is required, such as one might wish to supply for reproduction purposes to a newspaper or magazine.

A good bromide or gaslight paper print is first made from the negative. This is washed and dried. Next, the principal lines of the picture are gone over with a pen charged with such an ink as Higgins' indelible ink, manufactured by the same firm as the excellent and popular mounting paste. After this is perfectly dry, the print has its photographic portion dissolved away by being immersed for fifteen minutes in copper sulphate 50 grains, potassium bromide 50 grains, water 5 ounces. In a short time all signs of the photographic image will have disappeared, leaving the pen-and-ink sketch standing out boldly on the white paper. The print is then rinsed in a couple of changes of water; placed in clean hypo of the ordinary strength for five minutes; washed further for five minutes in half a dozen changes of water, and when dry the pen-and-ink sketch is complete.

In making these line-drawings it is, of course, left to one's own judgment as to what is to be put in and what is to be left out. Practice will be the best teacher, and as the materials for this work are not expensive, it will be a good plan to make several drawings from the same photogram until proficiency is attained. A good deal of the attractiveness of our sketch will depend upon the technique displayed in filling in the details. We cannot, of course, in a pen-and-ink drawing attempt to reproduce every detail, either of outline or light and shade, which is to be seen in a photogram. A compromise must be made by using such lines as seem to give the best "suggestion" of what is meant to be represented. Every line drawn, however, should be a line of feeling and quality: feeble and tentative lines are to



A photogram and a line sketch from an exactly similar print, made by Ernest W. Jackson to illustrate his article on p. 236.

be rigorously avoided. Tones should not be built up by a lot of meaningless strokes, but each line should contribute to the ultimate result. As pen-drawing has been termed the "shorthand of art," so in a perfect example one should feel that not a stroke could be spared and that nothing need be added to make it complete.

An incentive to do the kind of work we are discussing is the power one has to introduce a figure or figures. Photograms which may be good in other respects often lack interest through the want of the human element, and we feel how much a picture would be improved if only a suitable figure could be introduced into some particularly weak spot. The chief difficulty is to get the figure in correct perspective. A helpful method is to draw the figure first on a separate piece of paper and cut it out with scissors. Then by placing it on the picture and moving it about in various positions its correct place in the picture may be found. Flying birds in the form of triangular bits of dark paper may have their best positions indicated in the same way.

The introduction of clouds also is an important element in pen-and-ink picture-making from photograms. Here, again, practice and study alone will enable us to get the best effects, but if a few good pen-drawings by recognised experts are studied, the conventional methods of rendering clouds in pen and ink will be easily mastered.

Enlarged photograms on bromide paper may be copied in the same manner as direct prints, and if the photographer thinks it worth while it is a good plan to make a pen-and-ink sketch from an enlargement and then reduce it in the camera, say to about half-size. The process of reduction adds to the effectiveness of the work, and from the negative so obtained any number of copies may be printed.

Collotype and Photo-litho.

The Off-set Press, which is revolutionising lithographic work and is even being taken up by a number of the most progressive letterpress printers, will be the subject of notes in our next issue.

AMPHITYPE. — This new photo-litho process has been still further simplified and made more robust in its manipulative operations. It is now easier to handle on account of the use of lithographic thin varnish into the transfer ink; so that the tender treatment hitherto required is avoided.

The transfer may be run down to zinc, stone, or aluminium without being bleached in the soda bath; or, if this final bath is used, one pull through will suffice that every particle of ink will leave the transfer paper and become firmly implanted upon the printing surface proper.

As the soda bath is so infinitesimal in its cost, as its action produces a much more pleasing appearance of the transfer, and as its use invigorates an old or stale transfer, one that has been left about for even months after development, we think that the majority of transferrers will prefer to employ it. This paper preserves its sensitiveness indefinitely, and does not go bad with keeping. The inventor of this process is an old student of the photo-process classes of the Liverpool Technical School. Penrose & Co., Ltd., of London, are the selling agents and give practical demonstrations of its use in their Farringdon Road works.

NEGATIVE TRANSFERS FOR LABEL PRINTING, ETC. — Touch up the transfer, roll up strongly, wash, dry, and dust, first with finest resin, then with fine French chalk. Heat the surface by means of a blow-lamp, so that the lines may be burned in and high-etched, though a very high relief is unnecessary. Well rinse and dry the stone. Take dilute acetic acid and etch the stone for about two or three minutes; wash and dry. Take litho writing ink and spread it over the drawing. When dry, gum up the stone and fan dry. Take a dry cloth made up into a pad and wash out the image with turpentine. When the ink has been cleaned away, apply water to the stone, and with a rag and some ink thinned with turpentine, rub up the image until the work shows quite dark.

Then damp the stone and gum lightly. Take pure powdered tartaric acid and sprinkle on the stone, spreading it with a soft pad and wiping off the surplus. This polishes the positive image without damaging the ground. Take good litho ink and thin down with varnish. Apply with the blacking-in pad, with a few drops of turpentine, and the drawing is once more blackened. It is easier to ink in the work this way than with a roller, as the deep parts are reached. Further damp with water and wipe over with the gum sponge. A little more of the tartaric acid can be sprinkled on the cloth, and wiped to and fro until the negative image appears with great clearness and sharpness. Do not etch, as the tartaric acid prepares the bare parts of the drawing to resist the ink. This treatment is sufficient if only a single image is required for re-transfer. If it has to be printed from directly, well wash the negative print with water, dry, powder with the finest resin, rub with French chalk, melt with the blow-lamp, and gum-etch (not too strongly). Then well rinse with water, lightly gum, and dry by fanning. When the gum is dry wash out with turpentine and a dry rag, and rub up with ink thinned down with varnish and a few drops of turps. When all is well covered, water and the gum sponge again are applied. Rinse dry, powder with resin, rub with French chalk, and heat as a preliminary to further etching. In this way is produced perfectly sharp and clear drawings, serving equally as well as the expensive asphalt engravings.—*Deutscher Buch und Stein-Drucker.*

School Notes.

The I.T.U. Course of Instruction in printing is intended for the compositor, but it would interest all artists to see what an enormous amount of importance is attached to design. The designing and drawing of letters, what is commonly called "lettering," occupies a prominent position, as does the designing of display, for title-pages, catalogue covers, posters, advertisements in page and in column, etc., etc. The course is promoted by the International Typographic Union, and is given at the school of *The Inland Printer*. The chief instructor is Mr. F. J. Trezise, and the managing commissioners are A. H. M'Quilkin, W. B. Prescott, Robert E. Darnaby, and James M. Lynch.

The St. Bride Foundation Institute is the headquarters of lithographic instruction in the country, and each year passes nearly 150 students through the City and Guilds of London Institute examinations. The lithographic school is perhaps the most important of the St. Bride activities, although it is only one out of many. It owes much of its success to the earnestness, enthusiasm, and self-denial of two men, Mr. Charles Harrap, who is the organising manager and principal instructor, and Mr. James Crawford, who is the chief assistant. The prospectus for the session just commencing is full of interest, and may be obtained on application to the clerk to the governors.

The Manchester School of Technology issues a prospectus of a well planned scheme of work in the printing, photo-mechanical, and photographic department, under Mr. Charles W. Gamble.

The Syllabus for day classes includes:—Lecture courses on the Principles of Photography, by Mr. Gamble; and the Principles of Photo-mechanical Work, by Mr. Fishenden. Practical courses on the Practice of Photography, by Mr. Gamble; the Practice of Photo-mechanical Work, and Tricolor Block-making, by Mr. Fishenden; Typography and Machine Work, and Typography (Special), by Mr. Buckley.

The Syllabus for evening classes includes:—Lecture courses on Pure Photography, by Mr. Gamble; and on Photo-mechanical Photography, by Mr. Fishenden. Practical classes:—Photographic Negatives, and Advanced Photography, Mr. Gamble; Photo-mechanical Processes, Mr. Fishenden; Portraiture, Mr. Schmidt; Silver, Platinum and Carbon Printing, Mr. Coward; Retouching, Mr. Schmidt; Line Engraving, Mr. Webster and Mr. J. Graham; Half-tone Block-making, Negative-making, Mr. Fishenden and Mr. Brothers; Half-tone Block-making, Printing and Etching, Mr. W. W. Graham; Tricolor Block-making, Mr. Fishenden and Mr. W. W. Graham; Engraving for Calico Printers, Mr. Weir.

Lecture Demonstrations on Elementary Chemistry and Physics and their Relation to Photo-engraving and Lithography, will be given at the Bolt Court School on Tuesday evenings throughout the Session by Mr. A. J. Bull. Admission free to students of the school; to others, on payment of the ordinary school fees, as in prospectus. The first series commenced on September 28th, and deals with "The Chemistry of the Wet Collodion Process." Syllabus. — Elementary and compound substances. Combining proportions and the conception of the atom. Valency. Acid and basic compounds. Indicators. Salts. Ionisation of salts in solution. Precipitation of insoluble salts. The sensitising of the wet plate. Processes of reduction and oxidation. Reduction of silver nitrate. Action of acid restrainers. Physical development. Pyroxylin and collodion. Cyanides and fixing. Impurities in water. Distillation. Suitability of water for making silver bath. Methods of intensification.

Courses to follow:—Chemistry of Etching, Electricity and Electrolysis, Surface Tension, Action of a Lens, Selective Absorption in relation to Color, etc., Orthochromatic Work, and Three-color. The lectures commence at 7.30 p.m.

The Bolt Court Lectures for the season will be given on Thursday evenings at 7.30 p.m. Admission free. The dates and subjects are:—

October 7th, E. F. Strange, Esq., "Original Etching"; 14th, William Strang, Esq., A.R.A., "The Arts of Engraving"; 21st, Emery Walker, Esq., Holbein's "Dance of Death" Woodcuts; 28th, S. M. Peartree, Esq., "The Art Work of Durer."

November 4th, G. H. Palmer, Esq., B.A., "Manuscript Sources of Book Decoration"; 11th, Will Rotherstein, Esq., "Art in Relation to Commerce"; 18th, A. Johnson, Esq. (Art Editor of *The Tatler*), "The Selection of Photographs and Drawings for Illustrated Papers"; 25th, W. A. Casson, Esq., L.C.C., "Screen Plate Color Photography, with Examples."

December 2nd, Fred O. Penberthy, Esq. (Managing Director of Halftones, Ltd.), "Press Photography"; 9th, A. C. Middleton, Esq., "Early Experiences of Process Work"; 16th, A. J. Newton, "The Usual Methods of Reproducing Illustrations."

January 13th, Reinhold Theile, Esq., "Some Unusual Photography"; 20th, Chas. Burdick, Esq. (of the Aerograph Co.), "The Aerograph in Process and Lithographic Work"; 27th, Edgar Clifton, Esq. (of Messrs. Dallmeyer, Ltd.), "How Lenses Differ."

February 3rd, A. C. Jolley, Esq., "Electrical Equipment of a Studio"; 10th, J. A. Corey, Esq., "Recent Experiences in Electrotyping and Stereotyping"; 17th, C. E. Kenneth Mees, Esq., D.Sc., "The Rendering of Green and Blue in Three-Color Photography."

In addition to these special lectures, courses are given this session on "Chemistry and Physics of Photo-Engraving," on "Technical Photography," on "Further Developments of Theory of Photographic Processes," on "Papermaking" and "Stationery Manufacture."

Brevities.

The Photocromotype Engraving Co. has removed to its own new building, 920 Race Street, Philadelphia.

The Paynetype Process is endorsed by Stephen H. Horgan, who has tested it for himself and foresees great possibilities in connection with news illustration.

The Van Dyck Photogravure Co. of New York claims to produce its four-color machine-printed photogravures, in sizes up to 30 x 20 inches, at the rate of from 3000 to 4000 an hour. The process they work has been elaborated by Mr. C. W. Saalberg.

One hundred per cent. membership is claimed for the International Process Engraver's Union in the following cities in the West, viz., Des Moines, Ia.; Kansas City, Kan.; Topeka, Kan.; Dallas, Tex., and Houston, Tex. In several other cities the organisation is very nearly complete.

Jarrold & Sons, Ltd., of Norwich, were amongst the first firms to make extensive use of photolithography in half-tone, and they are doing a great deal of fine work both in black and trichrome. The department is under the charge of Mr. R. E. Wilkinson, who works direct camera subjects up to 72 x 52 inches, and who reports that the work is growing all the time. Amongst the excellent specimens sent to us are posters for advertising towns and railway systems, lace-curtain sales, sweetmeats, and Christmas crackers; maps, view books, booklet covers, "pageant" pictures, picture post cards, etc.

Planogravure is a newly coined term introduced by the Lakeside Press Company, of Chicago, to denote a half-tone screen litho process which they are using with remarkable success. They are securing high-light effects with an intermediate purity of tones which they claim is not surpassed by any other firm in the States. All the examples are done from zinc plates in the lithographic manner, and from the rubber offset machine. We have inspected ten different examples of this work. This enables them to print upon a beautifully "matt" paper of durable quality, and free from the glare of the coated papers. The manager is visiting Britain shortly on holiday.

ERNEST TINCHANT
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THE
JOHN CRERAR
LIBRARY

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS
ENGRAVER'S
MONTHLY
THE PROCESS PHOTOGRAM
ESTABLISHED JAN 1894

Vol. XVI. No. 191.
NOVEMBER 1909.

Founded by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly.*

A Revolution: Coming Quickly.

In a surprisingly short space of time the offset press has broken down opposition. Practically unknown twelve months ago, it is now in danger of being overdone with popularity. For great as are its advantages, it is not the best machine for everything. Properly used, it should open a great field for new work, ousting but little of the old, and so prove a boon to printer and to "process" man.

Many Presses: Many Makers.

The National Lithographer, which is devoting almost all its attention to "offset" work, advertises that printers should "read all about the seven different makes now on the market," but even while its advertisements are being printed, new makes are appearing. A month ago the offset press was purely a jobbing machine, and those who talked of its possibilities for newspaper printing, eventually, were set down as visionaries. To-day an offset news printing machine is on the market, showing that one responsible firm of mechanics, at least, has faith in the offset as a means for newspaper printing.

Not only the lithographic trade journals, but also those of the letterpress printing craft, are devoting much space to the new press. Many American photo-engravers are giving special attention to offset work; and one leading firm, as announced elsewhere in this issue, has set apart a special department for it. It is not possible here, nor is it our province, to discuss the various offset presses.

Originating in America, the germ of the idea seems to have been working in several minds at once, for the Rubel, the Harris, the Potter, and the Kellogg machines were practically simultaneous in their appeal to the public. The Rubel, the Harris, and the Potter were worked out by printing-machinery builders, and the Kellogg by a practical lithographer, who used the appliance with such success in his own work that he decided to start a machine-building business. Other machines to make up the seven — or more — can be found in America, but British and Continental builders have not been slow. English and German machines are on the market, and improvements in detail are being made weekly, if not daily, so that an absolutely up-to-date expert would be needed to say which of the many makes is best for any particular set of conditions. As space permits, we may be able to quote some of the considerations for and against the offset system as a whole, and the wisdom, or otherwise, of using it as a means of introducing the lithographic process into letterpress shops—but at present this can hardly be done.

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MANY PRESSES: MANY MAKERS.

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The Important Fact for Process Men is that the rubber offset press has made it commercially possible to transfer and to print, not only very fine half-tone, but even fine-grained collotype, with regularity of inking and on relatively rough paper. We have seen in the Kellogg office (and no doubt other press-makers can show similar results) extremely fine half-tones, excellent impressions, on rough drawing-paper, and transfer collotypes on somewhat similar surfaces. The effect of these possibilities is bound to be enormous—as one hardly needs to demonstrate to our alert readers.

The method was not introduced primarily for process work, but for ordinary commercial lithography, of which a good example is shown in our supplement by the courtesy of Messrs. Blades, East & Blades, the printers, and of the Lanston Monotype Corporation, Ltd., on whose "Harris" automatic high-speed rotary press it was printed. In early issues we hope to show examples of jobs which appeal more directly to the "process" man as being photographic in their inception as well as in their reproduction; but even the present supplement, showing a form of work in which photo-process is used for enlarging, reducing, transferring, etc., has its own interest, and represents a very big commercial field which has to be filled by the process-engraver of to-day or by a new school of photolithographers which is growing up in the litho establishments.

Fine Half-tone can not only be printed well, but also very rapidly. For instance, at a recent test of the Waite & Savile press, built in Otley, Yorkshire, it was shown to print fine half-tones, on demy sheets, on rough and hand-made papers, turning out every dot clear and sharp, with clean soft gradations right into the high-lights and the solid blacks as dense and full as anyone could wish. This was running up to 2000 an hour with hand-feeding, or 5000 an hour with automatic feed.

Fine Chromo and other Color-work is being printed on the offset press, which means that fine three-color half-tone is well within its power. Such work can be printed on papers that are beautiful to look at, comforting in the "handle," and absolutely as durable as paper can be made. And it can be done more cheaply than by letterpress in almost all cases. Is not this a *very* important matter for the half-tone man?

(To be continued.)

An Examination Paper.

The following answers are those actually found on a random-selected paper by one of the students at the recent Bolt Court examination. Five questions are set in orthochromatics, of which the student is asked to answer three. This particular youth tackled Nos. 5, 2, and 1. The other questions were:—

3. How would you determine the multiplying factor for any given filter and plate?

4. Give a few examples of common cases where a knowledge of orthochromatic photography is necessary in the studio, and state how you would treat them.

Examination on Orthochromatics.

Ques. 5. Why is it impossible to photograph a pure green as a white, while it is easy to do so with a yellow?

Ans. Green is necessarily a darker color than yellow on account of its having two absorption bands, namely, in the red and blue, while yellow has only one in the blue. In addition, the majority of yellows reflect a great deal more green light than greens themselves. A bright green will only reflect about one third of the incident green light, whereas a red will reflect nearly all the red light. Yellows being a compound of red and green, will consequently be very bright as compared with greens. Hence the difficulty experienced in getting greens to reproduce as white.

Ques. 2. How would you obtain photographically the black key for the reproduction of a colored original made with color washes over a black line drawing?

Ans. To extract the black it is necessary to select a filter which transmits all the colors of the original to some degree, and which passes the dark ones quite freely. It is helpful to look through several filters at the copy to ascertain this. If the exposure is prolonged somewhat, a good black key will be the result. Reduction and intensification will help such negatives in giving good prints.

Another way of arriving at the same result is to expose the plate for a short time through a set of tricolor filters, but these latter must be of good quality for such treatment or the images will overlap. Of course, a plate must be used which is sensitive to all the colors in the original. A light yellow filter with a panchromatic plate is very often sufficient.

Ques. 1. How would you choose a plate for photographing colored objects, and what should guide you in your choice?

Ans. If a truly orthochromatic rendering is required, the best procedure is to choose a plate which is sensitive to all the colors in the spectrum, such as a panchromatic plate, and use it in conjunction with a suitable yellow screen to cut down its extra sensitiveness to blue light. One then gets a correct representation in monochrome of the luminosities of the colors as they appear to the eye.

When dealing with color contrast the case is different. One could not distinguish between a red and a green patch if an orthochromatic representation was made; but the eye easily distinguishes them by their color. Consequently it is necessary to falsify the correct luminosity of one, in order to get contrast. One must remember when doing this that photographing in the absorption band of a color produces contrast, while in the transmission band it gives detail. Thus if we had blue lettering on a white ground, in order to get the letters black we must use a red filter to absorb the blue, producing the maximum amount of contrast thereby. When photographing furniture, which is usually reddish in color, a red sensitive plate and a red filter will bring out all the detail of the grain. It frequently occurs that an ordinary plate, which is only sensitive to blue, and no color screen, is the best plate to use; it could be used, for instance, to pick out red lettering on a blue ground. It is also made use of in three-color work to record the blue light reflected from the original.

If it is desired to photograph old documents or to avoid yellow stains in an original, a color sensitive plate and a yellow screen will entirely obliterate them.

THE LARGEST POSTER IN THE WORLD faces the Strand at the bottom of Kingsway, and is measured in yards (or fractions of a mile) rather than in feet or inches. It is not printed, but is an oil-painting.

The Photo-mechanical Jury at the Dresden International Exhibition. Photographed by Hugo Erfurth.

The "Process" Judges at Dresden.

By the kindness of Mr. Hugo Erfurth, the official photographer to the exhibition, who occupies a most charming unconventional side-light studio in the grounds, we are able to give a portrait group of the judges in the photo-mechanical section at the great International Exhibition at Dresden. Reading from left to right the names are:—Howard Spencer Levy, of Philadelphia; Prof. Dr. Luther, of Dresden; Director George Fritz, of the Imperial State Printing Works, Vienna, president of the jury; Dr. E. Goldberg, of the Technical Institute, Leipzig; the Editor of this journal, and Mr. H. J. Burger, head of the Polygraphisches Institute, Zurich, secretary of the jury.

As supplementing our notes of last month, it may be interesting to our readers to know that the jury was a part of a "Plenum" which met on Monday morning to discuss methods of judging and reporting, and to give instructions to the separate juries. The photo-mechanical jury then met soon after noon and divided itself into groups of two, to make preliminary examination of different classes of exhibits—prints, block-making apparatus and materials, printing machinery and materials. Each of the groups worked as long as light remained on the Monday, and some of the members were busy again before opening-time on the Tuesday, and again on Wednesday. The whole of the open time on Wednesday was spent by the jury as a whole, taking every exhibit in catalogue order, with information that had been worked out by the separate groups, and giving marks for each exhibit (some exhibitors were represented in several sections). The evening and Thursday morning were spent in analysing the marks, discussing the awards, and making out the statements of reasons for award. Noon on Thursday found all the juries gathered in Plenum, when each president read the recommendations of his own particular jury and the whole was open for discussion. Almost all the judges had had previous experience in international exhibition work. On the "process" jury the knowledge of Director Fritz and Mr. Burger, and the system they laid down proved most helpful; without them, the judging would have taken much longer. The fact that it took four days, in spite of fine organisation, gives an idea of the extent of the photo-mechanical section of the exhibition.

The following comments from *Photograms of the Year* may be of interest, as additional to the remarks in these pages last month:—

"A fortuitous delay in completing the printing gives chance for a further note, after spending a week on the Board of Judges. Now, with a very intimate knowledge of the important sections of amateur photography and of reproduction, and a thorough examination of certain other departments, it is possible to say that the exhibition is an entirely worthy result of a great and sustained effort — by far the greatest exposition of photography that the world has seen. The show reflects honor upon a great art craft; upon a noble city and an enterprising, art-loving State that supplied it lavishly with site, buildings, and funds; and upon a hard-working, able executive, amongst whom special mention should be made of the President, Prof. Seyffert, Prof. Emmerich, Dr. Goldberg, Hugo Erfurth, the Leipziger Buchgewerbeverein, Mr. Wolf-Czapek, and the ubiquitous indefatigable secretary, Mr. Karl Weiss, amongst whom the bulk of the actual work was distributed.

"Space is insufficient for dealing with even the pictorial section as it should be done, and it will ever be regrettable that the exhibition cannot be recorded in an adequate illustrated book.

"A great lesson in the value of organised national effort may be learned from the splendid show made collectively by Austria, which gave a large grant, built its own house, and displayed its pictorial, educational, photo-mechanical, and industrial exhibits under the best circumstances. The planning of the rooms, the lighting, the hangings, furnishings and incidental decorations, the free distribution of special catalogues and other illustrated booklets, and the provision of a special staff of attendants, with the Baron Heimberger as resident commissioner, all tended to make the Austrian section distinctive and to give a satisfactory, enduring impression.

"Reproduction by facsimile color-methods (half-tone, lithography, collotype, and photogravure) has been developed to an almost unbelievable pitch of perfection, as is shown in the exhibits of Blechinger & Leykauf, Vienna; J. Löwy, Vienna; Angerer & Göschl, Vienna; Husnik & Hausler, Prague; Max Jaffé, Vienna; Paulussen & Co., Vienna; and the great technical school over which Dr. Eder presides. In all the rest of the world the only exhibit fully on a level with these is the marvellous collection of facsimiles of the old masters by Albert Frisch of Berlin. Though photo-mechanical work is outside the province of the present book, these works are so triumphantly outstanding that every real would-be pictorialist should know of their existence. They place within the reach of the ordinary purse reproductions which are not mere reminders and suggestions, but which, for all practical, educational, and inspirational purposes, are as useful as the originals. Except in the matter of size in certain cases, one can now possess the actual masterpieces of the world; some of the greatest of ancient and of modern paintings."

Machine Etching.

No. XVII. The Levy Acid Blast Etching Process. (*Continued from p.* 180.)

Condensed from notes on a lecture at the Bolt Court School by W. Gamble.

Previous articles and notes.—1906: I. Jan., Dr. Albert's Method; * II. Feb., Concewitz's Method; * III. March, Levy's Method,* and notes; IV. May, the Holmström Method; * V. June, Swain's Views on the Levy Method; VI. Sept., W. G. Thorpe's Method; * VII. Oct., The Mark Smith Method; * VIII. Nov., More about the Mark Smith Method; * IX. Dec., More about the Dr. Albert Method, and notes. 1908: X. Feb., More about the Mark Smith and the Dr. Albert Method; * XI. June, The Method of Guilio Danesi; * XII. July, The Boyce Machine; * XIII. Dec., Dr. Albert's Patent; * XIV. May, Piolunkowski's Patent; * XV. June, The Holt Etching Machine; * XVI. July, The Mark Smith Rotary Spray Etching Machine; * XVII. August, The Levy Process.

* Indicates illustrations.

The figures represent the work turned out each night by one etcher averaging 7½ hours' work, including a meal time. Though they have two acid blast machines and two powdering machines, they only use one, the other being auxiliary as a stand by, or for extra rush work. Here are the figures—

Oct. 20th,	1908.	12	plates making	3100	sq. in.
„ 21st,	„	10	„	2318	„
„ 22nd,	„	9	„	2251	„
„ 23rd,	„	10	„	1980	„

Most of the plates were either 15 x 18 or 18 x 22; in fact, only three were smaller than 15 x 18. The plates get one bite on the half-tones of three minutes and one four-way powdering, taking 4½ minutes, and second bite of five minutes, and a last bite for the line work of seven to eight minutes. All their work goes at this rate. The work is usually mixed line and half-tone. In this office the turning out of a full page plate ready for routing inside twenty minutes is reckoned an everyday matter.

The reason why the time of etching is exceeded in this country is, I think, due to the fact that our etchers cannot get out of the habit of rolling up at some stage or other of the process, and thus they do not get the full benefit of the saving of time which the etching machine should give them. If the American dragon's blood process with four-ways powdering were adopted exclusively, a much greater saving of time would be shown, especially where the Levy etch powdering machine is used.

This latter machine is an important adjunct to the acid blast. The first machine of this type was installed in 1903 in the office of *The Boston Herald*, where they now have two of the largest size. It is a practically automatic machine. The plate to be powdered is laid on the receiving table face up against the projecting prongs of a carrier bar; the machine is then started; a small handle is next pressed down to bring the cylindrical feed brush into operation. The plate is now carried forward by the carrier bar under the feed brush, thence onward under a gang of elliptically moving flat brushes which pack the powder on the plate and clear away the surplus. The plate then moves still forward through a gas furnace, which is lighted up as the plate reaches it, and the powder is melted in place. Finally the plate reaches a cooling table, where the hot plate is swept on both sides by an air blast, which quickly cools it in readiness for a repetition of the proceeding in another direction through the machine. Putting the plate in its proper position on the receiving table, adjusting the gang brushes if necessary, starting the machine to go, and bringing the feed brush into operation, is all the etcher has to do. When the plate passes the feed brush the latter is automatically lifted out of operation; when it reaches the furnace the gas is automatically turned on and lighted; when it arrives at the cooling table the air blast is automatically started; when it emerges from the furnace the gas is automatically cut off, and when the plate is cooled to a proper temperature the air blast ceases and the machine automatically stops. By this time, 75 seconds from the starting, the carrier bar is back in its place at the front of the machine, and the plate is ready for the next operation.

It may be asked what are the advantages of these etching and powdering machines apart from the question of speed? I have heard it argued that a skilful etcher can take a plate through almost as quickly as a machine, and that in the case of half-tone work the saving of time being only a matter of a few minutes hardly justifies the outlay. Whilst it may be possible for an etcher by the ordinary methods to carry an individual plate through almost as quickly as on the machine, it could never be expected that he could keep up the pace throughout a working day. Moreover, the machine will do a plate as large as it will take every time just as readily as it will do a small one, and the advantage of the machine comes in when the American system is adopted of making up a large flat of stripped films which can all be etched together. It may be urged that some half-tones may require different treatment to others, but this can easily be dealt with by stopping out those parts of the plate which are sufficiently etched. In America it is quite the custom to mix up line and half-tone on the same plate, and no difficulty is experienced in giving each piece of work its due amount of etching. It is simply absurd for English workers to persist in the system of printing and etching each plate separately, or joining them up by soldering several plates together, as there is not only the waste of time in soldering, but also in making the prints separately, whilst there must necessarily be a waste of material in coating a number of plates with the sensitising solution, and of gas in drying them and burning them in, to say nothing of the electric light used in printing. There is also less risk of making a spoiled print or two. Several firms who have the largest size etching machines, taking plates measuring 23 by 19 inches, make it a rule not to put through any smaller size, and to get the plates ready for the machine, so as to keep it going continuously; in fact at the Amalgamated Press I understand that they use two plate holders for the machine, and keep two etchers employed upon it. One etcher is preparing his plate, whilst the other is etching his in the machine, and as soon as he has finished he lifts this plate holder in the machine. They use the Levy etch powdering machine, and this enables them to powder up the plates as fast as the machine can etch them. Now I am certain that no etcher, however skilful, would claim to be able to powder 23 by 19 plates, and even then as fast as the Levy powdering and etching machines, also keeping it up all day long. I have also heard it urged that although it might not be possible to etch the plates as quickly as the acid blast machine, it might be possible to roll them up or powder them in the ordinary way as quickly as by means of the powdering machine. I am certain, however, that that claim could not be maintained, if put to test, especially with large plates. When I was in America I made inquiries of several etchers who were reputed to be very fast workers as to how quickly they could powder up the plate four ways, and carry it through the various stages of heating and cooling, and none claimed to be able to do it in less than eight minutes, whilst the powdering machine can do it in four minutes. It may be said that it is not a very great saving of time, but it mounts up when it goes on day by day, year in, year out; moreover, the machine never gets tired, and it always does work of the same uniform quality. It only uses gas for heating at the moment the plate is passing through the machine, whilst a hot plate or burning in stove would have to be kept alight all day long. There is also, I think, much greater waste of powder in hand work than in the machine. Again, in the etching machine it is found that there is a distinct saving of acid. One etcher who was not at all partial to the machine, and tried to prove that he could do the work as quickly by hand, admitted that there was a saving of a pint and a half of acid on every large plate.

Mr. Stimmell, of *The Boston Herald*, states that he made tests which showed him that they were "saving practically half their money on acid."

The Phototype Co., of Philadelphia, also speak of the saving of acid.

As regards the quality of the work, I would quote from a letter I have had from the Walker Engraving Company, of New York, dealing particularly with copper etching of fine half-tones up to 400 per inch. They have made a great success of copper etching with the acid blast, and say:—

"As to the Levy etching and powdering machines, we can subscribe to everything the Gill Engraving Co. wrote you about, but we are less interested in the zinc machines, although we use them, than we are in the ones for etching copper half-tones. In that field it has been undoubtedly the largest step forward within the last ten years. When you consider that we have reduced the time of etching a 12 by 15 plate, made up of anywhere from four to fifteen different subjects, from twelve to three minutes, you can readily appreciate how it has increased our facility to turn out our work in just one quarter the time. Please remember that we work three shifts of men in every twenty-four hours, and draw your own conclusions.

"Aside from the saving of time, there are two points in which a plate etched on these machines is far superior to one we use to etch by hand. It retains the color, and the dots do not break abruptly where the high-lights meet the middle tone, but there is a decided softness instead where the two tones meet; and secondly, it used to happen so often that where a high-light adjoins a solid, for instance, on the edge of a plate, these dots would etch away. This never occurs on plates etched on these machines.

"The plates are etched, during this reduced time, deeper and cleaner than they were before, and we cannot recommend the machine too highly for saving of time and a remarkably improved quality."

This firm are noted for their 200 to 400 line screen work, and they say they can now get it deeper and more printable on the machine.

An important point which all firms using the machine are making in their advertisements is the greater depth obtained in the half-tone, enabling much finer screens to be printed on common papers and with cheaper inks, and further, that the plates are much more suitable for electrotyping and stereotyping. This is obvious when one examines microscopic enlargements of the plates.

My view is that etching by machinery marks a great advance in the process industry, and lifts it at once to a higher plane, both for uniformity of quality and also from a commercial point of view.

From the workman's point of view I do not think machine etching is a serious menace. I have not heard that it has displaced labor to any marked extent, if at all. The men who have been put on the machine are in all cases I know of experienced etchers, and in many cases the best man in the shop has been selected to work the machine. In only one or two cases has there been any resentment shown, and then only of the mildest character. My view is that the greater the facilities provided for doing the work more quickly and cheaply, the greater will be the influx of work. That is true in every industry where machinery has been introduced. There may be a little displacement of labor for a time, but the men who are thrown out of employment soon fall into other grooves. Even the American Photo-Engravers' Union have shown no opposition to the Levy etching machine; they have only insisted that a fully paid etcher shall be employed on it.

I do not believe we have reached any finality in machine etching. Indeed I know of several further developments that are likely to take place, and which will probably invade the ground of the fine-etcher, who should therefore not feel his position secure from the invasion of the etching machine. Even at the present time, as I have already stated, it is found that by modification of the character of the negative it is possible to almost entirely dispense with fine-etching. It would be well, therefore, for the fine-etcher to start at once to seek "fresh woods and pastures new."

✓Line-Etching: The "Dragon's Blood" Method.

By W. Ewen.

Few firms in England are successfully working the purely American method of dragon's blood etching for line work.

Many use the blood, but in conjunction with it they have to roll up with ink from time to time to keep the job from etching away. In America it is a rare thing to see a nap roller in the line-etching department. The blood itself, if rightly used, is all that is required to form an acid resist to carry the plate right through; and if the following formulæ is carefully carried out, the etcher will have no difficulty in producing a plate quicker than with the ordinary ink method that is so extensively used in process houses to-day.

First of all, coat the plate with albumen, and then roll up with Eagle * etching ink, which can be procured in various size tins. In passing, let me say this ink is very stiff, and a little should be got on the palette knife, and then mixed with turpentine on the rolling up slab, until it is of a consistency that will allow of its being knocked well out on the roller. After the plate is rolled up and the turpentine has been allowed to evaporate, it must be placed under a good force of running water; and if the exposure has been correct, the ink will peel off the unexposed parts quite easily, leaving a good strong print. Now dry the plate and dust with dragon's blood, which should not be too old or too new; because if the former it loses its adhering powers, and if the latter it is liable to stick on the whites and cause dirty and uneven etching.

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* Penrose & Co., Ltd.

The best way is to have about three parts new powder to about one part of old, and to ensure it always being in good condition, keep adding a little every day, according to the output of work.

Unless the subject is very fine, the plate will now stand a good first etch (which is a very essential point in blood etching), as the deeper your first bath, the better shoulder can you pack against the lines for the next.

After the first etch the plate should be dried by means of dabbing with a leather and powdered up the four ways. A good thick brush should be used and held at any angle so that the powder is packed well against the lines, and then burned in, until the blood changes into a dark brown color, but care must be taken not to overburn or else it will glaze and become brittle.

Three baths should finish a plate unless the lines are very delicate, in which case another powdering might be necessary. Of course the plate will not require any clean-etching or finishing, as it must be etched to the fullest extent every bath, so that there is no shoulder left round the lines at the finish.

The ink I have mentioned I have used personally for a long time and have never known the acid to get through, and I have also found the elimination of the roller in line-etching a big saving of time.

A Patent Grain Resist.

THE patent of Robert and of Robert Davos Bain claims "an improvement in producing a printing grain upon plates and other objects capable of being etched, and a combination of chemicals and substances whereby a photographic film is produced which forms a grained resist, producing automatically such points as are necessary for use (*inter alia*) in printing from typographic blocks, plates, and the like.

"The sensitive film is composed of adequate proportions of bichromate of ammonia, bicarbonate of ammonia, chrome alum, fish glue, gum arabic, and any vegetable gum containing bassorin, such as is contained in gums pertaining to genus astragalus, or any other gum containing amyloidal substances or starch or similar compounds, such as cerasin, arabin, tragacanthin or pectin, having an indifferent chemical nature and capable of swelling in water, being more or less soluble in the same. For example, a solution made up of gum arabic oxidised with (about 1 per cent.) chrome alum 20 per cent., fish glue 20 per cent., vegetable gum containing bassorin 20 per cent., bichromate of ammonia neutralised with (2½ per cent.) bicarbonate of ammonia 40 per cent., gives very practical results.

"The temperature and concentration of the ingredients of the film or coating being primary factors in the achievement of the results desired, care should be taken during the preparation of the solution that the temperature is not less than 40° C. or more than 60° C.

"The film in liquid form is placed upon a surface capable of being etched, and spread by means of a plate whirler.

"As soon as the plate has been properly

dried it is without further treatment (except lining and backing by known means), ready to be used for copying any original or copy of any picture or drawing, illustration, design, photo, or the like capable of being photographically treated, such copy being taken either from the positive or negative.

"The original is photographed without the use of a half-tone screen, or any similar screen or mechanical device for dividing the light, and the negative or positive, as the case may be, is printed direct upon the prepared plate or the like carrying the emulsion, nor is it necessary after the copy is taken upon the prepared plate or other like object to be etched, whether negative or positive, to prepare such plate or other object for the etching bath by any further treatment, except backing and lining with shellac varnish or the like by known means."

Openings for Trade.

THE production of printers' electros and of fashion-plate electros, and their distribution through the printing trade, are already successful specialties with certain photo-engravers. In Britain as well as in America this has grown into an appreciable industry, and only last month we had a note on a catalogue of an American firm specialising on electrotypes of emblems, etc. for friendly societies.

There are still untouched fields, suggested by the little that has been done already and by experience in kindred trades—as, for instance, in chromo-lithography. One good field is colored labels for spirits, pickles, jams, perfumes, cosmetics, tobacco, groceries, and many other kinds of packet goods of which tradesmen offer "our own brand." Some of the Scottish chromo houses keep large numbers of designs for elaborate spirit-bottle labels always ready for printing, with space for the dealer's name and address and his name for his own "brand." By making the same design serve for customers in a dozen or a score of different places, it is possible to sell to each of them a few hundreds of labels at a price far below the cost of drawing the design. While exactly the same thing is not feasible in the letterpress field, it is quite possible that stock sets of three-color or four-color blocks, prepared for certain trades, might be offered with advantage. The local printer would no doubt encourage the use of a set of blocks locally rather than the sending of orders for labels to Bristol or to Edinburgh; and while the (say) wine-merchant could not be expected to buy separate sets of blocks for each of his wines and spirits, what he lost in variety of designs would be gained by obtaining a local trade-mark for all his goods, which would make any bottle of his proprietary brands recognisable at once.

The seedsman and florist would be glad to have his own labels in many cases, and one colored design for flower-seeds, with one for vegetables, and possibly another for farm-seed packets, would give uniformity to his stock, and make every packet a good advertisement. The name of each seed would be printed in black or one of the colors.

A method that has worked with some success in America has provided for advertisers a weekly service of newspaper cuts, designs for handbills, etc. For a small subscription of about $2 a week, or $100 (£20) a year, the subscriber has been given the exclusive use in his own district of well designed, attractive matter, prepared especially for his trade, and changed every week. In some trades (*e.g.* in the tailoring) the services have varied in amount and in price, some subscribers paying $500 (£100) a year, and receiving special supplies of seasonable fashion-cuts, with other occasional matter, in addition to the weekly service. To a tradesman who does any considerable amount of advertising by newspaper or circular even £100 is a small sum to pay for a full supply of fresh, bright illustrations and ideas.

Syndicate illustrations for the newspapers have been tried in Britain without any very great success, but with just enough to show that the field is ripening quickly. Every day the use of illustration is growing in the provincial papers. The use of illustrations by the advertisers is forcing even the least enterprising of local papers to improve their printing, and the competition and example of the greater provincial papers are making the smaller ones feel the need of illustration. They want pictures: they are beginning to realise it, and they cannot pay very much for them. They are accustomed to the "syndicated" supply of fiction, news, and special columns, and the syndicated picture service is bound to grow into importance. Probably it will be supplied best by co-operation between a photo-engraving firm and two or three good press photographers.

✓*Relative Suitabilities of Blocks, Papers, Inks, etc.*

THE table on the opposite page, together with the notes that follow, are the compilation and copyright of W. H. Baker of Cleveland, Ohio, and are issued to their customers by the Eclipse Electrotype and Engraving Company, of the same city. Advertisements of this character, which tempt customers to file them and to use them for reference, are worth a good deal of trouble in designing; and the Eclipse Company has issued many, to which reference has been made in these pages from time to time. The notes on relative durability of printing plates, appended to the table, are as follow:—

A well made half-tone of 100 to 166 line screen should give from 30,000 to 50,000 perfect impressions on a cylinder press.

Half-tones finer than 166 lines should give from, say, 10,000 impressions for 300 line screen to, say, 40,000 for 175 line, under best conditions.

Half-tones coarser than 100 lines should yield up to 100,000 impressions.

Metzograph plates wear about the same as half-tones.

Well made zinc etchings should give up to 100,000 impressions; if full of very fine lines, a trifle less.

Well made electrotypes of zinc etchings, wood cuts, etc., should give anywhere from 100,000 to 200,000 perfect impressions; properly made nickeltypes about 50 per cent. more.

Electrotypes of half-tones, except the coarser screens, seldom give satisfactory service. Duplicate originals are to be recommended.

Wood engravings should never be printed from direct, on power presses. Direct impressions should only be made on hand presses, as proofs or art specimens.

The foregoing observations are based upon ordinary conditions of printing—proper paper and ink, machinery in good order, and good pressmanship. Deficiency in any of these particulars can ruin any job.

RELATIV ADAPTABILITY OF PRINTING PLATES, PAPERS, INKS, ETC.

PLATE	DUPLICATING QUALITIES				PAPERS BEST ADAPTED				Ink	Make Ready	Press Speed	REMARKS
	Stereo	Electro	Nickeltype	Duplicate Originals	Rough Cover and News	S. & S. C.	Plate	Coated				
60 li Halftone or coarser do	yes				yes			no	news	minimum	fast	Good screen for city newspapers, rough cover stock, etc.
65 li Halftone	yes				yes			no	cheap	minimum	fast	do
85 li Halftone	fairly well	yes			yes	yes			cheap	fair amount	medium fast	Good screen for country newspapers, circulars, covers, etc.
100 li Halftone	no	yes			no	yes	yes	yes	cheap	fair amount	medium fast	Not recommended for fine illustrating
120 li Halftone		yes	yes			yes	yes	yes	good	fair amount	medium fast	Good general screen, specially for covers
133 li Halftone		yes	yes			some grades	yes	yes	good	careful	medium	Good magazine screen
150 li Halftone		not advisable	yes	desirable		not advisable	yes	best	fine	careful	medium	Good book and booklet screen
166 li Halftone		not advisable	yes	advisable		no	not advisable	best	fine	careful	medium	Good fine book screen
175 li Halftone		no	not advisable	best			no	best	fine	careful	medium slow	For fine work only
200 li Halftone or finer do			no	best				best	fine	very careful	slow	Only for very fine work
00 Metzograph	yes				yes				news	minimum	fast	Coarsest newspaper screen
0 Metzograph	yes	yes			yes				news	minimum	fast	Coarse newspaper screen
No. 1 Metzograph	fairly well	yes			yes	yes			cheap	fair amount	fast	Fine newspaper and circular screen
No. 2 Metzograph		yes			fairly well	yes	yes		cheap	fair amount	medium fast	For general use, as covers, circulars, etc
No. 3 Metzograph		yes	yes			yes	yes		good	fair amount	medium fast	Good magazine and catalog screen
No. 4 Metzograph			yes			yes	yes		good	fair amount	medium fast	Good for books and booklets
No. 5 Metzograph			yes	best		yes	yes	best	good	careful	medium	For fine illustrations
No. 6 Metzograph				best		yes	yes	best	fine	careful	medium slow	For fine work only
Zinc line	yes	yes		not necessary	yes	yes	yes	yes	any	variable	any	Of universal usefulness
Zinc Ross	usually	yes			sometimes	yes	yes	yes	any	variable	any	Widely useful
Zinc Ben Day	usually	yes			sometimes	yes	yes	yes	any	variable	any	Widely useful
Wood	never	always or—	best	not necessary	"depends"	yes	yes	yes	"depends"	variable	variable	Cheap cuts fine fop catalogs; fine cuts the *ne plus ultra* of illustrations

Paynetype.

The complete specifications of this intensely interesting process are slightly abbreviated as follows:—

"My invention comprises improvements in the preparation of surfaces for photo-engraving or photo-etching, and the object is to provide a plate which may be placed in the camera and the required image obtained direct upon the surface to be engraved.

"I interpose between the metal base and the sensitised emulsion a substratum of collodion or other homogeneous substance, to prevent chemical action between emulsion and metal plate, and also as a resist for the etching fluid.

"When my process is used for intaglio or relief printing processes, and polish the metal and clean it free from grease, then coat with a substratum, for which purpose I prefer to use a 2 per cent. collodion, such as is made by dissolving pyroxline in a mixture of equal parts of methylated ether ·720 and ethyl alcohol ·90 per cent. I prefer to slightly color this collodion by a small quantity of a strong solution of the aniline dye known as brilliant green in ethyl alcohol. Though I prefer collodion, other substrata that prevent chemical action between the emulsion and the metal and act as a 'resist' to the etching fluid may be used, such as bitumen, gum-dammar, or celluloid, either singly or in combination.

"I coat the surface to which the substratum has been applied with a very thin film of fine-grained gelatino-bromo-iodide silver emulsion prepared with a hard gelatine, preferably without the addition of chrome alum or other hardening agent; and if required, the emulsion may be made color-sensitive by any of the usual methods.

"This emulsion must allow the light to penetrate, so that when the plate is developed the silver image will penetrate right through the film to the substratum.

"The plates are used in the following manner:—

"General Manipulations.

"The prepared plate is exposed in the camera in the usual manner either with a half-tone screen or without it, when line blocks are being made. It is then developed by the timing system of development, either with an acid developer such as ferrous oxalate, or an alkaline developer such as glycin. I prefer to develop for three minutes with the following developer at a temperature of 65° F.:—

Sodium sulphite (cryst.) - -	1¼ ounce.
Glycin - - - - -	½ ,,
Potassium carbonate (coml. anhyd.) - - - - -	2½ ounces.
Potassium bromide - - -	30 grains.
Distilled water - - -	30 fluid ounces.

"The plate is then washed with running water for half a minute.

"From this point onward the manipulations vary according to the particular work for which the process is being used.

"*Special Manipulations.—No.* 1 *Method.*

"To obtain a positive image from a negative 'original' (as in the making of a positive half-tone relief block from a continuous tone negative), or an intaglio block from a positive 'original,' the image is fixed by immersing the plate in a fixing bath (4 ounces of 'hypo' in 20 of water) for about half a minute, washed with water about one minute, and is then ready for immersion in the 'hardening' bichromate solution, which is referred to later on.

"*Special Manipulations.—No.* 2 *Method.*

"If a negative image has been obtained upon the plate, and it is required to convert it into a positive image, or *vice* *versa*, the washed negative (or positive), prepared as described in 'General Manipulations' is treated for a suitable time with a 'reducer' such as:—

Permanganate of potash - -	15 grains;
Sulphuric acid - - - -	75 minims;
Distilled water - - - -	20 fluid ounces;

which dissolves the developed silver image and leaves the undeveloped silver haloids in the film. The plate is then washed with running water for about half a minute and exposed to daylight or other suitable actinic light, for a few, say, five seconds, and again developed, preferably in daylight or strong actinic light, with ferrous oxalate developer, or the before-mentioned glycin developer, or any developer which does not render the gelatine insoluble. The plate must be developed until the image is right through the film. Three to five minutes is usually sufficient in daylight with glycin at 65° F., but a slightly prolonged development is not harmful.

"The plate is again washed with running water for half a minute, 'fixed,' washed with running water until free from 'hypo,' (usually for about one minute), then 'cleared' in 'hypo and ferricyanide reducer,' or a very weak solution of the before-mentioned acidified permanganate 'reducer.' The object of the 'clearing' is to remove all traces of the previously developed silver that may have been left on those portions of the image or 'resist' which will be subsequently dissolved away with hot water; for the presence of any slight veil or fog in the clear portions of the image would harden the gelatine when it is immersed in the bichromate solution and prevent the resist being properly developed. The plate is then washed with running water for about one minute.

"*General Manipulations.—Conclusion.*

"Assuming that a good clear image is obtained by either of the above methods, it is immersed for half a minute in the following bichromate solution used at a temperature at 60° F.:—

Potassium bichromate (cryst.)	½ ounce.
Potash alum (cryst.) - -	12 grains.
Distilled water - - -	12½ fluid ounces.

"This has the property of hardening the gelatine in the presence of the metallic image. Other solutions that have a similar catalytic action may also be used. The plate is then rinsed with water and developed like a carbon print in hot water of a temperature of about 120° F., first allowing the film to remain in the water for a minute or two and then assisting the removal of the soluble portions of the film by agitating the plate in the water, or by gently brushing the surface of the film with a small camel-hair brush, or similar soft material, whilst the film is immersed in the hot water.

"When all the soluble gelatine has been removed, the plate is fastened to a 'whirler' (such as is used by process workers) and the surplus water driven off by centrifugal force; then the plate is dried at a gentle heat by revolving it face downwards over a 'hot plate' or a flat bunsen burner. The film rapidly dries, and when dry is cooled and the collodion or other substratum removed from those portions of the plate that are not protected by the gelatine resist by gently wiping the surface of the film with a pad of cotton-wool moistened with a solvent of the substratum. A mixture of equal parts of meth. ether ·720 + ethyl alcohol 90 per cent. is used for collodion; and for celluloid, meth. ether ·720 for gum dammar, and benzole for bitumen. When the collodion substratum is used, wipe the plate finally with cotton-wool moistened with ethyl alcohol after the collodion has been removed with the mixture of ether and alcohol.

"The plate is then ready to be etched in the usual manner, the collodion or other substratum and gelatine film forming an efficient resist; after which it may be mounted and printed from in the usual manner.

"This process may also be used for the production of engraved metallic plates for ornamentation, such as illumined or memorial brasses, or for ornamental metallic fittings of any description, or for name plates, engraved dials, etc., either in intaglio or relief made in the manner already described; and if required the hollows may be filled in with colored wax or other snitable material.

"This process may be used in engraving or etching glass or similar substances by preparing the surface to be engraved with a suitable substratum and light sensitive emulsion, which is exposed in the camera and then treated as before-mentioned to form a suitable resist.

"I am aware that it has been previously proposed to use emulsion coated upon a flexible support such as metal from which the sensitised film may be separated by an intermediate layer of albumen or some silicate productive of adhesion for the purpose of preventing the film from blistering, also that it is not novel to use a copper plate covered with a graining film or etching ground which is coated with emulsion, and finally to use a metal plate coated direct with the emulsion; and I do not claim the operations previously described either individually or worked in groups of any order other than the sequence of operations above mentioned."

The method is supplemented by a later patent, just published, an abbreviation of which is as follows:—

"This invention relates to an alternative process in lieu of the method of converting a negative image into a positive image (or *vice versa*) described in my previous application, and consists in obtaining an electrolytically deposited positive resist.

"I prepare a positive image from a negative original, or a negative image from a positive original, according to the methods described in the specification referred to.

"If having obtained the negative image a positive resist is required, or *vice versa*, the prepared plate is immersed in a bath such as is used in the electro-deposition of metals and a coating of a suitable metal is deposited, either by means of or without an electric current, upon the face of the metal plate to be etched (the particular metal deposited would be one that is not affected by the etching solution used and so protects the metal plate where it is deposited), the substratum resist preventing the metal being deposited except where the metal is exposed. When a suitable thickness of 'metal resist' has been deposited upon the plate, it is removed from the bath and washed, the substratum resist being then removed from the plate, leaving the 'metal resist' on the plate. The plate is then etched in the usual manner.

"As an example:—A negative image is prepared upon a zinc plate from a line drawing in such a manner that if this plate were placed in the etching bath an intaglio plate would be obtained, but in the preparation of a positive image the plate receives a coating of copper by immersing it in a copper cyanide bath with the prepared surface facing a copper plate and passing a weak electric current through the solution in the usual manner. The substratum resist is then removed and the plate etched in an etching bath of nitric acid of about 5 per cent. to 10 per cent. strength as usual. Other suitable metals than copper may obviously also be used.

"The copper is deposited from a hot or cold solution of copper cyanide or such as is usually used for this purpose, the following solution being a suitable formula:—

Water - - - - -	80	fluid ounces.
Soda bisulphite - - - -	1	ounce.
Potassium cyanide 30 per cent.	3½	ounces.
Copper acetate - - - -	1¼	,,
Ammonia, ·880 - - - -	¾	fluid ounce.

Dissolve the bisulphite and cyanide separately in small quantities of the water. Place the copper acetate in a mortar and moisten with a little of the water, rub it into a thin paste, and add the cyanide solution. Add the bisulphite solution to the bulk of water, then add the acetate solution, and lastly, add the ammonia. Any of the usual electroplating solutions of copper cyanide may be used in lieu of above.

"I deposit silver upon copper or brass from a solution of silver cyanide used in the usual manner, and etch the plate in a perchloride of iron bath.

"By first etching the metal plate and then electrically depositing a metal upon the plate before removing the resist, metallic plates may easily be prepared with pictures and designs in inlaid metal.

"This process may also be used for the production of engraved metallic plates for ornamentation, such as illuminated or memorial brasses, or for ornamental metallic fittings of any description, or for name plates, engraved dials, etc., either in intaglio or relief made in the manner already described, and if required the hollows may be filled in with colored wax or other suitable material.

"I do not claim broadly the production of an etching resist by the electro-deposition of metals."

Dr. Albert's Improved Process for Producing Printing Plates for Letterpress or Litho.

THIS invention relates to "an improved process for the preparation of printing plates by etching. The objects are to simplify the etching process, to render it less dependent upon the personal skill of the worker, and to economise time.

"The copies required in the preparation of photo-mechanical printing blocks have heretofore been made almost exclusively by means of bichromate films; if the bichromate film is on copper, it is burnt-in to form an enamel and itself constitutes the resistant etching film. As the high temperatures required for this prejudicially affect other metals, the film of bichromate (generally albumin bichromate) is only utilised indirectly as support for another etching ground, by coating it, after the copying, with an etching ground, generally by rolling in an appropriate ink, whereupon the unexposed parts with the etching ground deposited thereon are developed with water and rubbing with cotton-wool, and then, after drying, dusted with powdered resin and melted-on.

"This process does not give as good results as when the bichromate film itself is used as the etching ground, as the rolling-in of the ink, the manual development with cotton-wool, the dusting with resin and the melting-on, impair the smoothness and fineness of the tone, especially in the case of delicate half-tones.

"Attempts have therefore been made to apply the etching ground to the subsequent printing surface in the first place, then to prepare this etching ground with a bichromate film, to copy and develop as usual, and then to utilise the bichromate film as a protecting film against the solvents for the etching ground.

"The process most nearly resembling the present invention heretofore employed is described by Husnik as consisting of pouring over a metal plate a bitumen solution prepared in turpentine and benzine, or in some other etheric oil, and then treating the bichromate copy with a mixture of two parts of olive oil and one part of turpentine oil, by rubbing the metal plate until the bared bitumen is washed off and the metal appears clean. The plate is then washed with soap and water, and it is endeavored to rub the gelatine away so carefully that the bitumen beneath it is not injured. The bitumen is sufficient for efficient first-etching; the plate is then cleaned and prepared for the second etching in the usual chemigraphic manner by rolling-in fresh ink, etc.

"Although these experiments date back three decades, hitherto no success has been attained, so that it would appear as though the conditions for success were either not known or that the means selected were not suitable for attaining a technically satisfactory result.

"To attain such, it is first of all necessary to prevent the solvent from soaking through the bichromate film, which is of course very thin, as otherwise the etching ground would also be dissolved at places where it should be protected from the solvent by the bichromate skin. This condition can only be fulfilled by a solvent of considerable consistency or viscosity, so that it will not penetrate the bichromate skin before the etching ground has been dissolved at the exposed places. Etheric oils will not give this result, as they are of low consistency. On the other hand, the capacity of a mixture of turpentine oil and olive oil to act as a solvent is so small that the dissolving process must be assisted by rubbing with cotton-wool, which manual operation requires personal skill and entails sources of error, like the bichromate-albumen process, the avoidance of which is the object of the process.

"It is also necessary that when the etching ground has been dissolved on the places not protected by the bichromate skin, it should be possible to wash the dissolving liquid or dissolving mixture from the plate speedily and thoroughly, as in the course of a considerable time the solvent would penetrate the bichromate skin.

"The cleaning-off of the olive oil mixture with soap and water, for the purpose of cleansing the metal plates from the fats, is not well adapted to interrupt suddenly the dissolving process, if only for the reason that the soap does not exert its action immediately upon the fatty substances; apart from the interruption of the dissolving action, a short action of the soap and water does not even produce a thorough cleansing of the plate, while if the soap and water is allowed to act for any length of time it readily penetrates the bichromate skin and attacks the bitumen beneath it, as is clearly apparent from Husnik's statement that 'the attempt must be made to rub the gelatine away by washing with soap and water so carefully that the bitumen beneath it is not injured.'

"The conditions for attaining a successful result can only be obtained when bodies are selected for the etching ground support which dissolve readily in liquids of considerable consistency or viscosity, and which are readily miscible with water. Owing to their resistance to acids, resins are most suitable bodies, as they readily dissolve in alcoholic liquids; for the greater parts these liquids mix readily with water in all proportions, and, for reasons of economy, water alone is also used for removing the solvent from the plate as speedily as possible. Alcoholic liquids can also be very readily thickened with bodies which are soluble both in alcohol and in water, and which, such as tannic acid, for example, tend to harden the bichromate skin. Alcohol also mixes in all proportions with glycerine, which is a liquid of considerable consistency, and which again is soluble in water in all proportions; if etheric oils be selected, all these favorable factors are excluded completely.

"Broadly, this invention consists in using alcoholic solutions of high consistency and high solvent capacity so that the etching ground readily dissolves if they are merely poured over the plate, or if it be immersed therein, before the solvent has filtered through the bichromate skin, and in quickly interrupting the dissolving process by bringing the plate at the proper moment beneath a water pipe, preferably provided with a distributing rose.

"The particular steps of the process and the materials preferred are as follow:—

"The plate is covered with resin to form an etching ground, next a bichromate film is deposited over the whole of the plate and the copy formed by exposing the plate to light and dissolving the soluble bichromate in water; the plate is then immersed in a liquid consisting of alcohol which has been thickened by the addition of tannic acid or glycerine, or both, to strengthen its dissolving power. This readily dissolves the resin from the exposed parts of the plate, the other parts being protected by the bichromate film, and as soon as that is accomplished the dissolving process is instantaneously stopped and the plate cleansed by bringing it at the proper moment beneath a water pipe provided with a distributing spray, the plate being then ready for the etching bath.

"By this means it is possible to make an impression from the plate after the preliminary etching, to free the plate from the residue of ink adhering to it by means of benzine or turpentine and drying it with sawdust, and then for the retouching process to be carried out and the final etching undergone without rolling-in fresh ink, dusting with resin powder, and subjecting to heat, as has been necessary in processes employed hitherto which frequently gave rise to error and loss of time.

"Besides economising time the results are more certain, since the positive printing elements are still covered with the original etching film when the plate is operated on by the retoucher, who is therefore certain that the desired effects will be obtained in the final etching.

"If plates instead of being etched are gummed, they can be used as lithographic plates.

"An important advantage obtained by using resinous substances for the etching ground is found in the fact that there are a number of alcoholic resins to choose from which do not dissolve in etheric oils. For instance, sandarac is insoluble in benzine or turpentine.

"A plate on cheap metal can be obtained by this process giving equal results in quality to those of a copper plate.

"It should be understood that the terms 'viscosity' or 'consistency' are used herein in a relative sense, to indicate a liquid whose flowing properties are somewhat slow, as compared, say, with water; it is not meant to suggest a very viscous substance like paste, or treacle, which would be far too slow, but simply one which will allow of the uncovered etching ground being dissolved without the covered etching ground being affected."

Business.

The Consolidated Engraving Company, New York, has taken premises in 151–155 West Twenty-fifth Street.

The Photochromotype Engraving Company has removed to its own new building, 920 Race Street, Philadelphia.

A Strike in New York State.—The whole of the employees in the three photo-engraving concerns in Albany and the one in Troy went out on strike on Oct. 7th. There is no question of hours or wages, but of the employers' refusal to sign the Union Agreement. On Oct. 6th Mr. Matthew Woll, President of the I.P.E.U., addressed the members in Albany and district, and an ultimatum was given to the employers, with whom negotiations had been in progress for a long time. On Oct. 12 there was a conference at which a settlement was hoped for, but at last report (Oct. 13) the matter was still in abeyance. A second conference, between a committee of employers, Mr. Patrick J. Downey of the State Department of Labor, and Mr. Matthew Woll, was called for the 13th. Twenty men are affected, and according to *The Albany Evening Journal* "the proprietors say that within a few days or so they will be able to go on with their business as usual." The firms affected are the Austin Engraving Company, the Albany Engraving Company, the Empire Engraving Company, and the Troy Engraving Company.

Collotype and Photo-litho.

Multiple-color work of great fineness, in nine colors and tints and worked eight on, is being done on the offset press by the Werner Company, Akron, Ohio.

A rotary collotype machine, patented by Giulio Danesi, prints from aluminium plates. Its register is said to be so perfect that a sheet can be passed through twice, to obtain rich double-inking effects. The speed is much greater than that of any collotype machine yet made.

An offset-press plate department has been established by Gatchel & Manning, Philadelphia, especially to deal with offset work. We believe this is the first special department of its kind in the world.

Printing from gelatine, according to Mr. J. T. Butterfield's address to the Printers' Managers' Association, is employed in six different processes, viz.: (1) compo-litho (more commonly known as hektograph, scriptograph, or jelly-pad printing); (2) the auto-copyist method; (3) photo-autocopyist; (4) ordoverax; (5) sinop; and (6) collotype.

Litho on Oil-cloth.—Use an ink rubbed up with middle varnish and a little of a fluid siccative. Dust each print with powdered French chalk to prevent offsetting when piled; then lay the printed cloth on a heated plate long enough to make the ink amalgamate with the oil-cloth surface. A little experimenting will be necessary to show the heat and time needed for fixing the ink on oil-cloths of various thicknesses.

Coarse-grain Photolitho Transfers.—C. Real says:—"Take Nelson's No. 1 gelatine, 60 parts; distilled water, 400 parts. Soak the gelatine in the water for an hour. Dissolve in 100 parts of distilled water 2 parts of bichromate of potash and 12 parts of bichromate of ammonia. Melt the gelatine by the usual hot-water bath and pour it in a thin stream into the bichromate solution. Finally, add 12 to 15 drops of ammonia, and stir constantly while adding 20 to 24 parts of a 1 to 5 solution of chloride of calcium and 8 to 12 parts of a 2 per cent. solution of chrome alum. Filter, and coat perfectly level plates. Dry at a temperature rising gradually from 115° to 150° F. These plates, when exposed, will give a perfectly natural grain, finer or coarser according to the quantities of calcium chloride, alum and ammonia used, and thickness of coating. If a greater separation of grain is wanted, submerge the plate, after washing and drying, for about six to ten minutes in a 1 per cent. solution of ammonia heated to about 85° F., then harden for about two minutes in a 2 per cent. formalin solution, wash and dry again. Transfers from these plates are admirable for the offset press, as they do not require to be reversed."

Litho up to Date.—On Saturday, Sept. 25th, in connection with the classes in lithographic printing at the Bradford City School of Art, a lecture was delivered by Mr. John Widdop, of London, entitled, "The Last Word in Lithography and Color Printing." In the absence of the chairman of the school sub-committee, the chair was taken by Mr. Chas. Stephenson, A.R.C.A., the Principal of the school. At the outset the lecturer drew attention to the prevailing depression in the lithographic trade, subsequently pointing out that art subjects hitherto exclusively printed by lithography were being reproduced by more than one competing process. He particularly emphasised the importance of adopting photography in conjunction with the offset machine, and a closer study of the possibilities of aluminium, to enable lithography to hold its own and to recover lost ground. The lecture was illustrated by a magnificent collection of specimens, showing clearly that lithography is, in properly skilled hands, capable of yielding the finest possible results in art reproduction.

At the close of the lecture, which excited remarkable interest, a hearty vote of thanks was accorded Mr. Widdop for his comprehensive review of the subject, and the opinion was expressed that much could be done, by means of study in technical classes, and by periodical discussions on trade subjects, to enlarge the capabilities of lithography, minimise the losses and delays sometimes experienced, and thus bring about a welcome revival of trade.

School Notes.

The Bolt Court Lectures for the month are:—November 4th, G. H. Palmer, Esq., B.A., "Manuscript Sources of Book Decoration"; 11th, Will Rothenstein, Esq., "Art in Relation to Commerce"; 18th, A. Johnson, Esq. (Art Editor of *The Tatler*), "The Selection of Photographs and Drawings for Illustrated Papers"; 25th, W. A. Casson, Esq., L.C.C., "Screen Plate Color Photography, with Examples."

The Polytechnic, which re-opened on October 14th, has a syllabus of great interest for all process men. In addition to three courses in photo-engraving, dealing respectively with dry-plate negatives, wet-plate negatives, and block-making, there is a course in tri-color photography. The principal instructors are: Howard Farmer, the Principal of the School; Charles H. Hewitt and C. David Kay, with George C. Laws and Harold Harrison in the photo-mechanical department.

The Operating-room at Bolt Court is illustrated by a little block made in the school from a student's photogram. It shows the crowded state of the room, which has no waste equipment or waste space. In the fine new building that is to be erected on the same site by the London County Council there will doubtless be a studio with wonderful conveniences; but many a student will look back with regret to the pleasant busy days and evenings spent in the present hardly-adequate quarters.

Specimens and so forth.

The Premier Engraving Company issues a collection of very good specimens, of line, half-tone, duple, and three-color, including a series of reproductions of one subject through screens of various grains.

"Some illustrations of process printing, with a few practical remarks," is the latest Hentschel advertisement, and a splendid piece of work it is. It fully shows the high quality of the Hentschel block-making and also of the Hentschel service in "artistic publicity."

A BIG THREE-COLOR PHOTO-LITHO POSTER that is on the London hoardings just now, reads: "The last word in cocoa — BOURNVILLE." It is a job from Jarrold's of Norwich, a 4-sheet 60 x 40, printed from twelve 70 x 50-inch plates and making a fine long strip 160 x 60. Such a composite job is a much more stringent test of printing efficiency than is the running of a big edition of a single subject where each print is complete in itself. When for joining up on the hoardings, there must be uniformity of color and inking. The job speaks well for Jarrold's and for Mr. R. E. Wilkinson's photo-litho department.

"THE OXFORD JOURNAL ILLUSTRATED" (established in May 1753 as *Jackson's Oxford Journal*) started its pictorial career with much enterprise and promise on October 6th. It is an issue of sixteen pages, 17 x 12 inches, with a full service of illustrations, photographed, reproduced, and printed by its own staff. It begins excellently, with an interesting varied service of picture matter, and with just a little more experience in the adaptation of ink to paper, it should compare well with any of our illustrated news-sheets. The printing is done on a Cossar press built by Payne & Sons, of Otley, and every detail of the photographic and process departments is similarly up to date. The ancient metropolis of learning and "The Oxford Times" Company are alike to be congratulated on their new enterprise.

Brevities.

THE BISSELL COLLEGE OF PHOTO-ENGRAVING has been re-endorsed by the International Association of Process Engravers.

A LAZY MAN IS NOT MUCH WORSE than a dead one, except that he takes up more room, and sometimes he manages to draw wages.

DELIGHTFUL TRICHROMES are being used by the American Steel and Copper Plate Company on their monthly advertising calendars.

THE WILLIAMS-LLOYD MACHINERY Company has just issued one of the most complete catalogues ever seen of photo-mechanical supplies of all kinds. One of the interesting and novel devices is "the Reliance Proofing Device" for securing register easily when making proofs in three-color.

SEVERAL MILLION POSTERS have been given by the Poster Printers' Association of U.S. and Canada toward the fight against tuberculosis.

THE MILLER UNIVERSAL GAUGE, saw and trimmer, a most popular machine in America, is now on sale in England by the Canadian-American Company, 8 Bouverie Street, London, E.C.

"VEIL" IS THE TITLE given by Shackell, Edwards & Co. to what has been known as a half-tone "key." With one graded tone-print and one "veil" in their "landscape" process inks they are producing some excellent effects which block-makers may well introduce to their customers.

ENGRAVING COPPER ROLLERS appears to be attracting attention in the United States, and experiments are being made with coatings, which appear to prove unsatisfactory. Experience has shown that the way to coat rollers is by transfer of the printed resist, which takes the form of a carbon print.

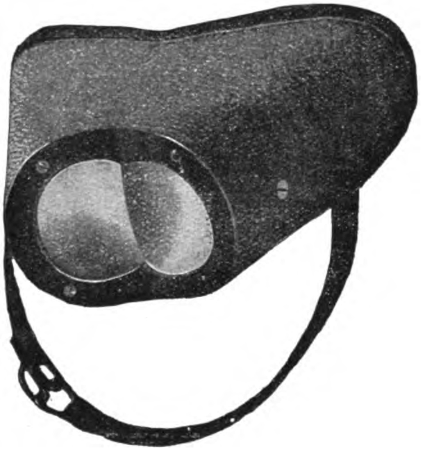
"NO CLOCK-WATCHERS NEED APPLY."—An advertisement to which our attention is directed by the process men of the *Belfast Evening News*, offers good wages to assistants "who will allow our business to come before their sweethearts, theatres, and pleasure parties." It concludes,—"Clock-watchers are useless to us."

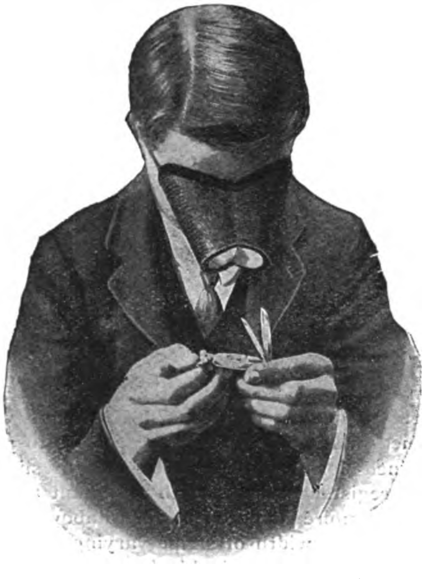
WAGES HAVE BEEN RAISED by the efforts of the I.P.E.U., according to the statement of the president, to the extent of $520 a year (£2 a week), and 97 per cent. of the workers in the trade are members of the union. Moreover, 95 per cent. of the membership are working only forty-eight hours a week, which is a very material reduction for most of them.

THE USE OF PORTRAITS IN ADVERTISING has recently been before the Appellate Division of the First Department of the Court of New York State, with the result that it has been held that the American citizen has good cause of action if either his portrait or his name be used for advertising purposes without the user having obtained his consent in writing.

FISH-GLUE RESISTS IN THE TROPICS.—It is found well to keep the enamel in a refrigerator, and also to take special care about exposing it to stray light, both after coating and afrer printing, in very hot and humid weather; also that the negatives often tend to be less dense in such weather, and that the enamel may be blamed for what is the fault of the negatives.

THE CONVERGISCOPE of Penrose & Co., Ltd., is a most convenient form of medium-power magnifier for examining the half-tone dot, either on the focussing screen or on plate or paper; or, in fact, for any purpose to which the pocket microscope can be applied. Its design will be understood from the illustrations. Its binocular vision gives a better view than is obtainable with one eye, and prevents eye-strain, while both hands are left quite free. The construction is of very light wicker-work with edging of velvet to fit the face and an adjustable strap to go around the head. The price is reasonable, and the apparatus looks like coming into general use.





THE AMERICAN TARIFF, revised up instead of down, as folk expected, seems to be giving much dissatisfaction, and even the printing trade and "process" journals are going out of their usual course to comment adversely. The lithographers, however, who have been agitating for greater duties, in order to stop the import of German picture postcards, are very pleased with the increase.

THE INTERNATIONAL PHOTO-ENGRAVERS' UNION reports 3224 members in good standing, and a balance in hand of very nearly $40,000 (£8000). The receipts during the past year have been $25,293 (£5050), while the expenditure was $20,607 (£4120). Eighteen members died during the year, a mortality of less than six per thousand, which seems very satisfactory: and thirteen were treated in the sanatoria for tuberculosis.

THE AMERICAN METHOD WITH THREE-COLOR BLOCKS has almost invariably been for the maker to be the printer also, and to give no quotations for the supply of blocks, but only for editions of prints. Thus he was more in the position of the lithographer than of the photo-engraver as known in Great Britain. The Barnes-Crosby Company of Chicago has been working out a collodion emulsion method introduced by Theodore Freundorfer, and is now making a great point of the willingness to sell sets of three-color blocks. The half-tone negatives are made direct from the original objects, which has not been the usual course in America.

E. HAMEL & Co. in the current *British Printer* receives description and ample illustration. Evidently the business is growing and prosperous, and it is well known to be excellently organised and equipped. Mr. Hamel is one of the personalities of the process-engraving world, proud alike of his ability to trace his descent from the days of the Norman Conquest, and of his training in photo processes with the brothers Levy in Philadelphia. In Nottingham he finds good scope for his inherited ability and his American acquirements, and has built up a great business in eleven years.

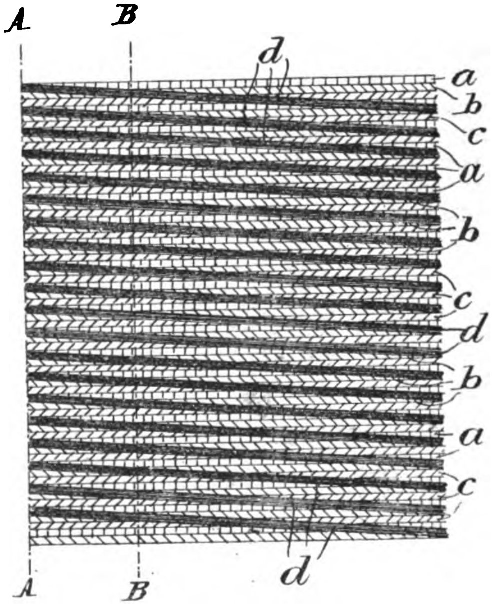
THE AUSTRALIAN PROCESS ENGRAVERS' UNION has just held its first annual smoking concert. The chair was taken by Mr. W. R. Bagnall, the president, and both newspaper shops and commercial firms were well represented. It was stated that three fourths of those employed in the trade were in membership of the union. The programme of harmony was in the hands of Messrs. Bagnall, Harrison, Osborne, Such, Ricketts, De Warre, the brothers Blackburn, the brothers Smith, and other members. Toasts were proposed by Messrs. Bagnall, De Warre, King (editor of the *Town and Country Journal*), Martin, and T. Gleeson, one of the oldest process men in the Colony.

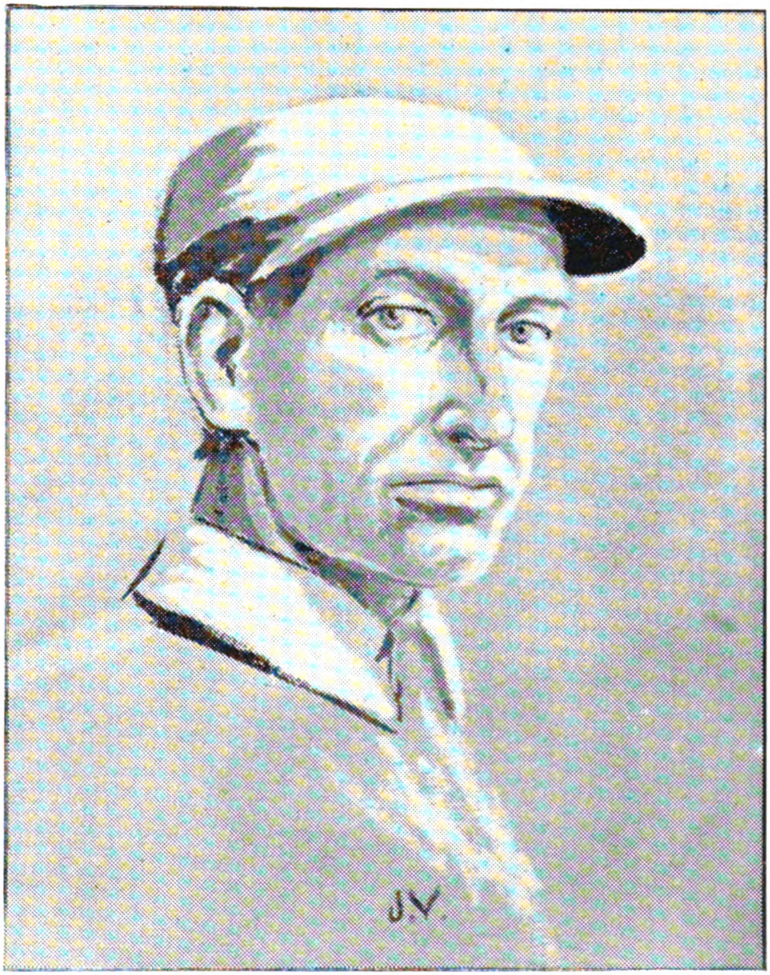
The Employing Photo-Engravers' Association of America (otherwise the open shop association) is starting its fifth year with every appearance of confidence and satisfaction. At its conference in Detroit, Mich., the secretary said that union and non-union men alike applied for work in the "open" shops, and that they wrought alongside one another with perfect amity. The new officers for the current year are:—*President*, James A. Pierce (Matthews-Northrup Company, Buffalo, N.Y.); *Vice-President*, H. H. Macnamara (Grip, Ltd., Toronto); *Treasurer*, A. J. Van-Leynen (Van Leynen & Hensler, Detroit, Mich.); *Secretary*, J. J. Whirl, Stevens Building, Detroit, Mich. *Committee:* H. G. Bogart (Central Engraving Company, Cleveland, O.); L. F. Eaton (Peninsular Engraving Company, Detroit, Mich.); and Sam Ohnstein (Crescent Engraving Company, Chicago, Ills.).

The Future.—The *Graphische Revue*, of Vienna, has been considering the prospects of further development in illustration work, and concludes that enormous advances in method and increases in the use of illustration are yet to be looked for. It considers that the next few years will prove critical for the lithographic business, and that much will depend upon whether lithographers take up photo-mechanical methods or not. If they do, they will help greatly in the popularising of "process"; if not, it will still grow, in spite of them, and they will suffer. The *Revue* looks upon the autochrome as a serious competitor in the preparation of colored originals, just as the camera and the dry-plate have proved in monochrome; and it quotes the extensive use of the autochrome by one of the Munich engravers as a significant proof of its practical value.

The highest praise is given by *The Inland Printer* to *The Figures, Facts and Formulæ of Photography* as the very best book of reference for the process engraver. And although we have personal interest in the book, we have no hesitation in supporting our contemporary's advice to those who want a real "Enquire Within on Everything" of the process world; because it is a simple fact that this one book has more complete formulæ, and is more recently revised, than any other book in print. Further, the revision had the assistance of some of the best practical men in the business. The interleaved edition, with its cloth binding, is worth the extra shilling charged for it in any place where such a book is in frequent use, as it ought to be. The press, including our own magazine, is constantly providing hints and formulæ which one wishes to keep, and the interleaves offer an obvious place for such matter.

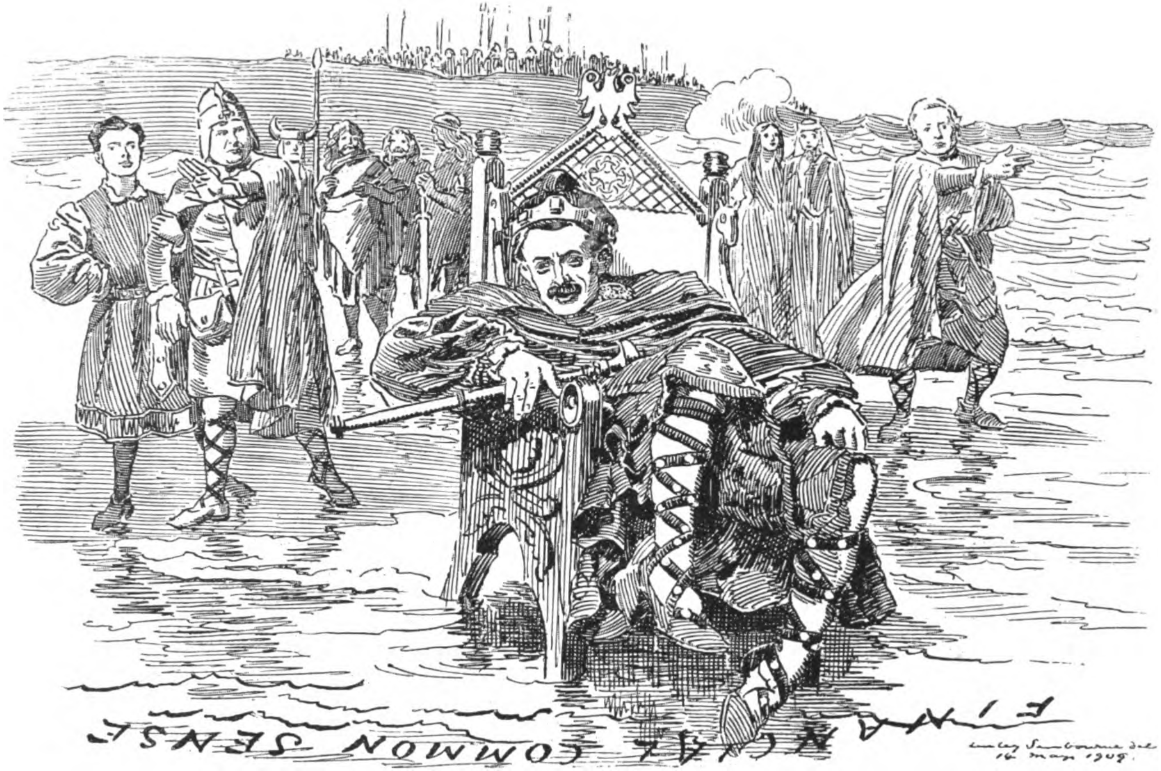
The Rheinberg Process of obtaining varied color effects for certain advertising purposes is an interesting and curious one, and may develop to be of distinct use to the process man. Mr. Rheinberg prepares paper, ruled or printed with very fine lines of red, yellow, and blue in juxtaposition, and it will be seen easily that if a lined key, in suitable form, could be printed over the rulings, a natural-color effect would be produced, just as in the case of the Lumière, the Thames, or the Omnicolore transparencies. This, however, is especially disclaimed by Mr. Rheinberg, who prefers to print his lined-block over the color-lines in slightly out-of-register positions, with the result that he produces moiré stripe effects in rainbow colors, and with the width of stripe varying according to the angle at which the block crosses the ruled lines. The use of a black key "saddens" the effect considerably, but the method allows of printing in any opaque colors, and with grey or white fairly lively and brilliant results may be obtained.





Coarse half-tone made by the Paynetype process direct from original sketch. Etched on the Levy Acid Blast Machine.

The Paynetype process was described fully in our last issue. Sensitised metal plates, with all necessary instructions and materials, will be offered to the trade by Penrose & Co., Ltd.



Reproduced by the special permission of the Proprietors of *Punch*.

Photographed by the Paynetype process direct upon the metal plate from an ordinary copy of *Punch* purchased at the bookstall. Etched on the Levy Acid Blast Machine.

Estab. Jan. 1894.
"The Process
Photogram."

THE PROCESS ENGRAVER'S MONTHLY
THE PROCESS PHOTOGRAM ESTABLISHED JAN 1894

VOL. XVI. No. 192.
DECEMBER 1909.

Edited and founded by H. SNOWDEN WARD, F.R.P.S., Founder of *The Photographic Monthly.*

Printing-plates and Blocks of Celluloid.

MICHAEL ANDREW DROITCOUR, of the Miehle Printing and Manufacturing Company, Chicago, claims patent for a method of making printing plates of plastic material, especially from celluloid or other material which can be softened by heat.

The process is intended to take the place of the ordinary electro-plate or stereotype processes, to greatly simplify, expedite and cheapen the making of printing plates, and especially to dispense with the slow and expensive work of building up the plates for fine work.

Generally stated, the process consists "in forming such printing plates from celluloid or other plastic material which is capable of being softened for molding to the matrix and will then harden to maintain this form. In the preferred practice the process consists in the application of steam directly to a face of the plastic sheet laid against the matrix in order to both soften the sheet and also press it into the depressions in the matrix. The invention also comprises other process steps, such as the cooling of the plastic sheet, the grinding of the back thereof to get uniform thickness, and, for some purposes, the flowing of some suitable plastic material on to the back of the sheet to thicken and strengthen the same.

FIG. I.

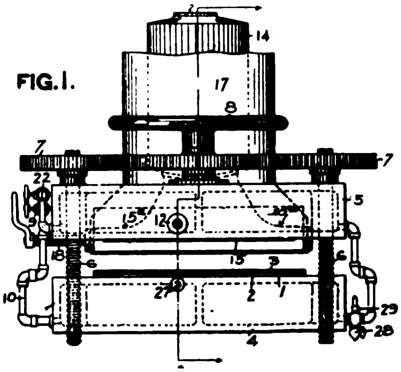
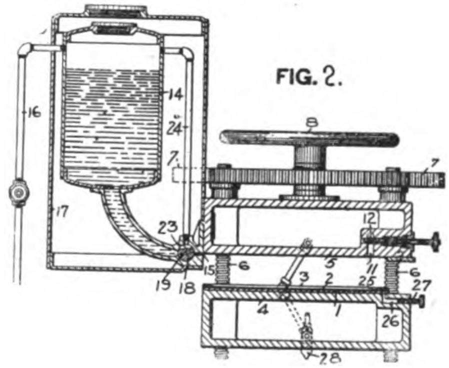


FIG. 2.



"In the accompanying drawings, fig. 1 is a front view of a suitable press adapted for forming the plastic printing plate; fig. 2 is a vertical section through the same showing the parts preparatory to pressing; fig. 3 is an end view; fig. 4 is a vertical section showing the application of the celluloid backing; fig. 4*a* is a sectional detail showing a different position of the valve; fig. 5 is a perspective view and fig. 6 a sectional view of the frame used; fig. 7 is a section on an enlarged scale through the matrix, the plastic sheet and frame laid on the same, before the application of the steam; fig. 8 shows these parts after the application of the steam; fig. 9 is a similar view after the application of the plastic backing material; fig. 10 is a diagram illustrating the grinding of the back of the plate; and fig. 11 is a vertical section through a press, showing a modified method.

FIG. 3.

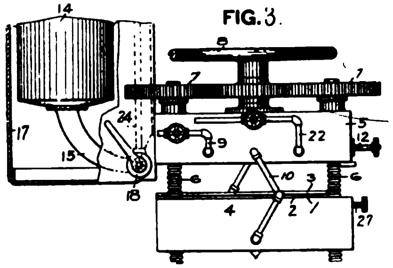


FIG. 4.

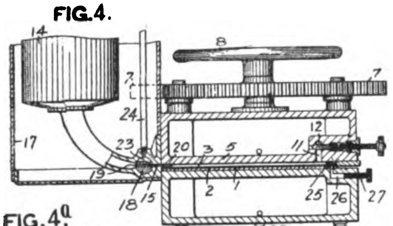
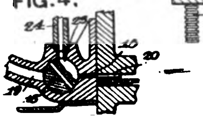


FIG. 4a.



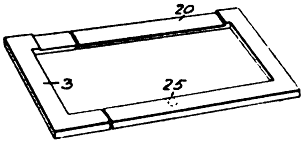
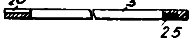


FIG. 5.

FIG. 6.



" In carrying out my process any suitable plastic material capable of being softened for moulding and afterwards set may be used, but I prefer celluloid or a similar pyroxylin composition. Also I prefer to use steam as the medium for heating the plastic sheet and pressing it down into the matrix, but any other suitable fluid medium capable of softening the composition and of exerting pressure against the same will answer the purpose. For brevity herein I refer to celluloid and to steam.

FIG. 7.

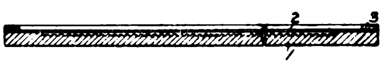


FIG. 8.

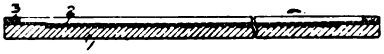
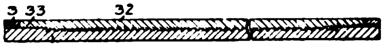


FIG. 9.



" I can make use of any suitable apparatus, and in figs. 1 to 4 show one form of press suitable for the purpose. A matrix, 1, may be formed in any desired way, from the matter to be reproduced. Upon the type face of such matrix I place a sheet 2 of celluloid and then place a frame 3 upon this sheet, said frame resting upon the edges thereof, as shown in fig. 7. These assembled parts are then placed in the press, which comprises a bottom platen 4 and a top platen 5, which

FIG. 10.

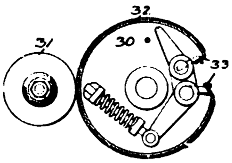
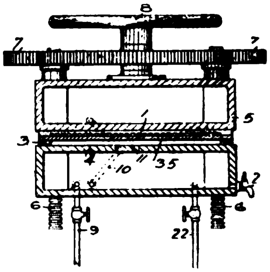


FIG. 11.



can be brought tightly together and again separated by suitable means. The matrix, etc., are tightly clamped between the platens of the press, preferably heated, as by being made hollow and providing one thereof with a steam inlet 9 and connecting the chambers of the two platens by means of a tube or flexible pipe 10. Steam is then admitted between the top platen 5 and the top or back face of the celluloid sheet 2, as from the chamber in the top platen, through an opening 11, which is controlled by a suitable valve 12. The steam introduced between the top platen and the celluloid sheet is confined by the frame 3 on the edges of said sheet. The steam acts by its heat to soften the celluloid, and by its pressure to press the softened celluloid into the depressions in the matrix. Thus the lower face of the celluloid sheet is given a form which is an exact reverse of the matrix.

"Where time is not an essential element, and especially for fine screen work, half-tone engravings, etc., the celluloid sheet 3 will be very thin, say one-hundredth or two one-hundredths of an inch in thickness, so as to require only a few seconds for softening and pressing down into the matrix, and will press down into very fine lines in the matrix. When such a thin sheet is used it must be backed to give it sufficient body to resist the pressure of the printing press. I back the same by flowing on to the same while still in the press some plastic material which will form a close adhesion with the sheet. Many forms of plastic material can be used for this purpose, one of them being celluloid, in a softened or semi-liquid condition, contained in a reservoir 14, from which leads a pipe which spreads out, as indicated in dotted lines 15*a*, fig. 1, into a wide nozzle 15 communicating with the space below the platen 5 and within the frame 3.

"The plate is cooled, for instance, by turning off the steam from the platens and admitting water, which may be done through a pipe 22. This cools the plate rapidly, causing the celluloid to set. To overcome shrinkage and to give a perfect type reproduction, the celluloid is held under pressure while cooling. When the celluloid is cooled the press is opened and the sheet can be readily removed from the matrix. The matrix can be used in making other similar plates.

"The plate so produced is liable not to be uniform in thickness at all points, and in printing would give different degrees of impression. To produce uniformity of impression I remove from the back of such plate all the high parts, as by grinding, as shown in fig. 10.

"This method of making plates is expeditious, as an application of steam for five seconds suffices to soften the celluloid and press it fully into the matrix. The backing of the sheet when necessary and the cooling are very quickly performed, and the subsequent grinding or equivalent operation is also a rapid operation, so that it is possible to turn out printing plates for ordinary newspaper work in considerably less time and with much less expense than under the stereotype or electrotype processes. The removal of the high spots on the back of the plate insures absolute uniform thickness and gives equally as good results in fine magazine and book work as the stereotype or electro-plates in which several days' time of an expert has been consumed in building up to proper thickness. The celluloid presses down into the matrix with such exactness that it has been found possible to reproduce half-tone work in fine screens.

Schneider's Photolitho Process.

A French patent has been granted to Hermann Schneider for a process of direct transfer of a photographic image to stone or metal for printing lithographically. The patentee claims to preserve all the detail and gradation of the photographic original.

The ordinary stone or metal surface is finely grained by the known methods, then cleaned up by means of a weak solution of nitric acid or other suitable solution, and dried rapidly. It is slightly warmed, thinly covered with a preliminary coating of gelatine, the surface being then maintained at a temperature of 104° Fahr. until quite dry. A solution of

Albumen - - - -	20 cc.
Saccharic acid - - -	10 ,,
Water - - - - -	200 ,,

is then applied over the substratum of gelatine, and dried. Next prepare:—

A.	Chrysaniline - - -	2 grammes
	Chloride of zinc - - -	50 ,,
	Water - - - - -	100 cc.
B.	Bichromate of potassium -	14 grammes
	Bichromate of ammonia -	30 ,,
	Water - - - - -	1000 cc.

Take equal parts of A and B, mix and flow over the stone, then drain off the excess of solution. When the coating is dry, exposure is made under a photographic negative, in a good light of normal intensity for from ten to fifteen minutes. A special rolling-up ink is made of lamp-black, Venice turpentine, and black writing-ink, mixed while hot, and with the addition of a paste of bitumen and resin powdered very fine, and beef fat. This ink is well distributed with a hard roller, and the surface of the stone well rolled with it all over. The image is developed by passing very lightly over the surface of the stone a sponge saturated with water. When the print has been developed, clean, gum and dry. Sponge over to remove the gum, clean off the ink with turpentine, and etch with a weak solution of nitric acid to remove the sensitive film. Keep moist by the application of salt water, and ink up with a lithographic roller. Make ready for proofing by the usual methods.

Note that the photographic image is applied directly to the printing surface, the coating which has served for sensitising being destroyed by the nitric acid before the last inking. In the ordinary photolithographic process on stone the photographic image receives the ink, but in the present process this image is removed, and the stone itself, cleaned by the acid, is inked and gives the print. The method is excellent for the perfect reproduction of photograms from nature, pen-and-ink designs, water colors, etchings, etc., and can be used with success for three- and four-color work.

THE DEMAND FOR LITHO STONE has been almost exactly stationary for several years, for while some countries are increasing its use (*e.g.*, the United States imported 50 per cent. more last year than in 1900), others are decreasing. In order of quantities used the first five countries are:—Germany, France, Italy, Great Britain, and the United States. Although the price of litho stone seems high, it is stated that the business is carried on at a very small profit, because an enormous amount of useless earth and rock has to be moved in quarrying, because not more than one-twelfth of the stone obtained is marketable, because a large proportion of this is in small sizes, and because much of the waste stone has to be sawn and partially smoothed before it is possible to find the defects which render it useless. At the present rate of consumption, the Solenhofen quarries can supply the world for about two hundred years.

("The Process Photogram.") December 1909

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Albumen Paper for Photolithographic Transfers.

By A. Saal.

Translated from *Le Procédé.*

In tropical climates albumen paper proves itself much superior to gelatine paper for photolithographic printing. There are, however, certain faults which it is necessary to notice if the final result is not to be seriously affected.

All lithographers know that the dimensions of paper vary according to hygrometric conditions, and many accidents in chromo-lithographic printing are entirely due to this fact. The same difficulties are found very unpleasantly exaggerated in photolithographic transfers.

For work demanding exact precision, one may substitute for ordinary paper other supports less extensible, such as metallised paper or prepared metallic sheets; but this want of extension being gained only at the cost of much more serious inconveniences, we return to the use of a paper which, despite its faults, remains the best used for transfer work. We are then obliged to lessen the importance of the stretching due to damping and drying by the careful choice of paper-making materials, by proper treatment of the fibre, by spreading it in more homogeneous sheets, and finally by sizing, glazing, or waterproofing. Although appreciable progress has been made in these directions, we have not been able, notwithstanding certain interested assertions, to obtain a non-stretching paper; those presented as such, if they fill this rôle sufficiently well in small sizes, still show very decided variations when we come to large sheets, during the course of successive dampings and dryings necessary in photolithographic work.

In the topographical service of the Dutch Indies, where among other map-making labors we have to print topographical maps of large size in several colors, we use an albumen paper specially made for us in one of the most important European houses. This is sent to us in sizes of 92 x 117 cm. (46 x 36 inches). Measured as taken from the packets, it is slightly larger than this size, and a little less after complete drying in open air.

To give some idea of the variations in size of such a paper, alternately damped and dried, I give in a numerical table (overleaf) the results of a large number of measurements.

The paper has been measured directly on being taken from the original packets, then after drying in the open air, and finally after drying in the sun. It has also been measured after damping, drying, re-damping and re-drying, in order to show the effect of successive dampings.

Examination of the table shows that the stretching after damping is much greater in width than length (columns D and I), the difference between the two variations diminishing after drying (columns E and K). The greatest alteration is obtained by damping a paper dried in the sun after two dampings (line 6, columns D and I), and the smallest by damping a sheet taken directly from a packet (line 1, columns D and I).

We find also less explainable anomalies between sheets in the same batch, sub-

EXPERIMENTS ON STRETCHING OF ALBUMENISED PAPER, IN SHEETS 117 CM. × 92 CM.
(ABOUT 46 INS. × 36 INS.).

No. of Sheet.		Weight of Sheet, Dry, in grms.	No. of the Test.	Variations in Width.					Variations in Length.				
				Width in cm.			Variation in mm.		Length in cm.			Variation in mm.	
				Dry. A.	After Damping. B.	Re-dried. C.	Stretch by Damping. D.	Shrinkage by Drying. E.	Dry. F.	After Damping. G.	Re-dried. H.	Stretch by Damping. I.	Shrinkage by Drying. K.
I.	New sheet, from packet . . .	..	1	92·1	94·1	91·8	20	23	117·5	118	117·25	5	7 5
II.	Old sheet, dried in air . . .	..	2	91·9	94	91·4	21	26	117·35	118·5	117	11·5	15
III.	New sheet, dried in air . . .	108·19	3	91·95	94·1	91·52	21·7	25·8	117·31	118	117	6·9	10
,,	The same sheet, damped and re-dried	93·95	4	91·52	95·54	91·1	21·7	24·2	117	117 7	116·7	7	10
IV.	Sheet dried in sunshine . . .	109·1	5	91·65	93·85	90·95	22	29	117·22	118	116 5	7·8	15
,,	The same sheet, damped and re-dried	107	6	90·95	95·9	91·06	29·5	28·4	116·5	117·85	116·55	13·5	13
V.	Sheet dried in sun, damped, then dried in shade	..	7	91·7	93·9	91·5	22	24	117·2	118	116·6	8	14
,,	Average of variations of the sheet .	..	8	..	..	..	22·56	25·77	..	..	..	8·53	12·07
,,	*Average, adjusted to the square metre*	..	9	*100*	..	..	*24·52*	*28*	*100*	..	..	*7·29*	*10·31*
VI.	New sheet, dried in air . . .	107	10	91·76	94	91·9	22·4	21	117·15	117·72	116·9	5·75	8·25
,,	The same sheet, damped and re-dried	97·3	11	91·9	94·1	91·5	22	26	116·9	117 7	116·52	8	11·75
VII.	New sheet, dried in air . . .	114·1	12	91·85	94	91·95	21·5	20·5	117·5	117·7	117	2	7
,,	The same sheet, damped and re-dried	104·7	13	91·95	94	91 5	20·5	25	117	117·7	116·7	7	10

mitted to the same treatment; thus, for example, sheets II. and III., where the variations in width are plainly identical (columns D and E), have very different variations in length (columns I and K). We notice also that while the least extension in length is 2 mm. (12, I), and the greatest, 13·5 mm. (6, I), is seven times more; in width the extreme extensions are 20 mm. (1, D) and 29·5 mm. (6, D), which is only a one and a half times variation. If the pressing can explain the systematic differences of extension in length and width, only the differences of quantitative composition can explain such anomalies; but the attempts made to detect variation in the proportions of weight between albumen and the paper have yielded for ten sheets very similar results—something like 13 grains of albumen per sheet in a total weight of 110 grammes. However, our means of investigation were not sufficiently delicate to give us conclusive figures.

Tests made on the lightest (VI.) sheet I was able to find and on the heaviest (VII.) show that it is probably in the differences of weight and composition that we can find the cause of the anomalies in question, since they are here carried to the maximum for lessening after a first damping; in all cases after two dampings, each followed by a drying, all manipulations possible with the paper have only a limited effect, and cause no further variation in connection with lateral or longitudinal extensions.

Let us now see what can be the practical effect of these methods in the technique of photolithographic reproductions. A length of 1 metre measured on dry paper successively with regard to width and length is increased after damping respectively to 102·452 cm. and 100·729 cm. But every printer knows that passing under the press stretches the paper even when this is stretched already; we know that under a medium pressure this stretching, which is in the direction of length, is about one-third of the greatest extensibility, say in our case 0·24 cm. The original length of 1 metre is then increased after passing under the press to 100·97 cm.—still very disproportionate to the width, 102·45.

It is not necessary for the transfer that the proof should be completely softened. We can, on the contrary, best transfer from a paper only damp, not wet. Under these conditions its width is reduced much quicker than its length, and would become even less than the original if drying is carried to the extreme limit, as can be seen by noting the table of measurements. It may be asked if advantage should not be taken of this fact to carry the drying so as to find the initial dimensions. But it should be noted that contraction, very marked during the first drying, is only partial during the second, and is shown no more after further damping. Now, the paper bears at least two baths before transferring (sensitising and developing); and, on the other hand, too dry a paper will not lend itself to transferring. At the moment when the paper is in a damp state most fitting for transferring, it is still very far from having regained its initial dimensions. It must, in fact, be admitted that the paper is fully ready for transferring when it has lost three-quarters of its total extension, so that the dimensions given a space of 1 square metre are, before transferring, 100·61 cm. × 100·18, and afterwards, according to the way the paper is passed under the press, 100·82 cm. × 100·18 or 100·61 × 100·24—a variation which would still cause an inadmissible distortion for cartographic work.

We have tried to correct this distortion of the transfer by an inverse distortion of the photographic negative, by inclining the original and the sensitive plate at an angle to the optical axis, but this very complicated method cannot give sufficiently distinct images. We have also tried to distort the original by placing it on paper heavily pressed during drying in full sunlight at the time of reproduction, the direction of pressing scarcely varying, while the other direction decidedly contracts.

In the Cartographic Institute of the Dutch Indies the method adopted consists of drawing on the paper ordinarily used in the department of originals, but allowing for the distortion of the transfer, thus adopting for the drawing a different scale in the two perpendicular directions.

BLACK NEWSPAPERS. — The proposal, to which we have drawn attention during recent months, that newspapers should be printed in white ink on black paper, instead of the reverse, is still being pushed by Mr. Albert J. Marshall of the Bureau of Illuminating Engineering, of New York. He says that writing and printing with black symbols upon a white surface has simply been a matter of convenience, which crystallised into a matter of habit, and which never has been seriously studied by men with a view to deciding whether it is the best way. He contends that if all our books and papers had dark backgrounds with light symbols there would be a great saving of eye-strain, and incidentally it would become possible to use up all our old newspapers for the manufacture of paper, whereas at present they are valueless for the purpose, because of the expense of cleaning the pulp from the ink that has been used upon it. As an example of the ease of reading light symbols on dark ground, he instances the writing of chalk upon a blackboard, which is much more easily seen by children than would be writing of the same size in crayon upon white paper. He also refers to the displays in jewellers' windows, where some of the best visual effects are obtained by displaying gems and trinkets upon backgrounds of dark velvet, which are specially chosen to absorb as much of the light as possible, so that the only light reflected comes from the objects displayed.

Half-tones for the Offset Litho Press.

"The National Lithographer" says:—"Such fine work is being done from half-tones on the offset press that some photo-engravers are beginning to make plates especially for that process. The half-tone made for the offset press is an entirely different affair from the same kind of a plate made for the type press. In the first place it is made 'direct,' and therefore does not have to be reversed in transferring. The photo-engraver in making a half-tone plate for the type printer, reverses it; thus the lettering on the object reproduced comes out on the metal plate reversed, and when it comes on the printed sheet it appears, of course, properly. In making a plate for an offset press this reversing process is omitted by the photo-engraver, as he wants the plate to come out 'direct.' The reversing is done naturally when the transferrer puts down his transfer on the zinc plate. Thus the photo-engraver is not only enabled to make a plate for an offset press with less actual labor, but he also obviates the possibility of spoiling a negative in the process of stripping off the film and reversing it. There is another feature, however, of this 'direct' half-tone that will appeal strongly to the printer. The 'direct' plate is bound to be sharper, cleaner, and better than the one that has been stripped and reversed. Any photo-engraver will tell you that when he has the making of a sketch from which half-tones are to be made, and wants a particularly sharp, clear plate, he has the sketch drawn 'direct,' and therefore does not have to strip the negative. The ordinary half-tone when printed on an offset press is reversed twice before it appears on the printed page: the first time by the photo-engraver, and then by the transferrer. Both of these transactions can be saved by ordering the engraving made 'direct.' This is easier for the photo-engraver, and, even to a greater extent, easier for the transferrer. And, further than that, the work done from it is infinitely superior."

A "Monthly Statement."

From *The I.A.P.E. Bulletin.*

600 minimums, loss on each approximately 41 cts. apiece, total loss - - - -	$246·00
400 larger cuts, including one 8 x 10, total profit - - - - -	261·00
Total profit for month - - -	15·00

If those 600 minimums could only talk, maybe they wouldn't raise a howl! I can fancy one calling me a fool for selling it below cost; another calling me a poor business man for selling it for $1.50 when it cost me anywhere from $1.75 to $2.25 to make it.

I am sure if those minimum cuts were human, they would chase me out of the shop, run the plant themselves, and, no doubt, make some money.

A minimum cut asked me the other day how much longer the farce was going to continue of selling him below cost. I told him that I did not know. "I guess there are too many of you fellows in the business," said the minimum sarcastically, and then he skulked to the shipping desk to be handed out for $1.50.

Another minimum popped up and asked me if I was going to continue to make a fool of myself just because the other fellow did.

I think that minimum was right. The minimums represent about 60 per cent. of my business. Yours very truly, —— Engraving Co.

Focussing to Scale.

By Arthur Fruwirth, in "Photo-Engraving Art."

The problem of automatic focussing has tempted several investigators, and two patents have been granted, one to Mr. Koenigs, Professor of the Sorbonne in Paris, in 1900, based on the principle of the well known pantograph, the other to T. Carpenter, of Paris, based on the application of a right angle lever in 1897. These two, as well as other systems, devised by G. Frecot, have the same defects in common: they cannot be attached to existing cameras, need a ground-glass for measuring the sizes, and easily get out of order.

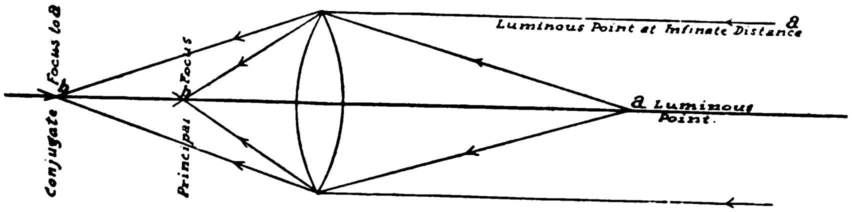


FIG. 1.

Focussing by means of scales is much older, the most universal, though rudimentary, example being the snapshot camera with its focussing scale. A long step in the right direction has been made by the Penrose people of London.

It is to the credit of an American, Mr. Benedict, of Chicago, to have solved the problem of automatic focussing as far as is ever possible without the introduction of mathematical calculations. His system is thoroughly practical, and the readings taken from his large reduction chart, which is a model of perfection, have nearly mathematical correctness. The focussing scale is prepared by reducing 12 inches to all sizes at intervals of ¼ inch, and marking the foci in accordance with the indices of the reduction chart.

My own experiments complete this short sketch of history. In 1899 I completed my first system, and since that time the ground-glass has lost its job with me. The system was published in *Anthony's American Annual.* In 1904 I gave the scales a still more precise form and superseded the reduction meter by the tables of reduction and enlargement.

My system is based on the following mathematical calculations: Light diverging from one point will after transmission

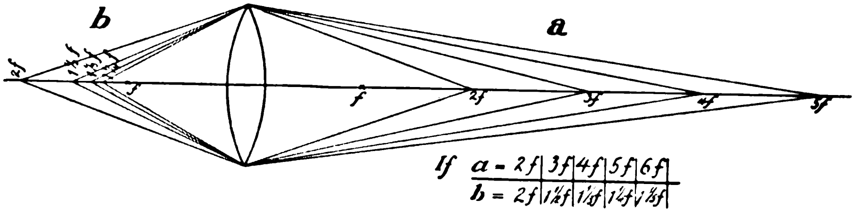
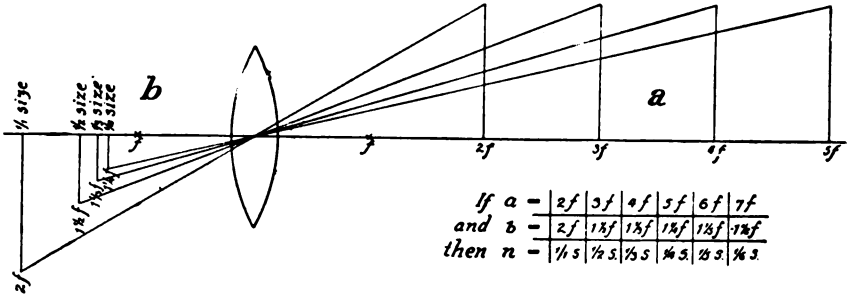


FIG. 2.



If a =	2f	3f	4f	5f	6f	7f
and b =	2f	1½f	1⅓f	1¼f	1⅕f	1⅙f
then n =	1/1 s	1/2 s.	1/3 s	1/4 s.	1/5 s.	1/6 s.

FIG. 3.

through the lens converge to another point. These two points are called conjugate foci. If the luminous point is at an infinite distance, its conjugate focus becomes the principal or equivalent focus of the lens—that is, the nearest distance from the lens at which a sharp image is formed (fig. 1).

Principal focus and conjugate foci bear a definite relation to one another, expressed by the equation:

$$\text{Equation 1.} \quad \frac{1}{f} = \frac{1}{a} + \frac{1}{b}$$

where f = equivalent focus.
a = distance of luminous point } from lens.
b = distance of image } from lens.

Fig. 2 will show some of the more characteristic positions of a and b, which form the foundation of my automatic system.

Substituting for the luminous point an object of definite size, the relation between a, b, f and the size of object and its image is expressed by the equations:

$$\text{Equation 2.} \quad a = \left(\frac{m}{n} + 1\right) f.$$

$$\text{Equation 3.} \quad b = \left(\frac{n}{m} + 1\right) f.$$

where a = distance of object } from lens.
b = distance of image } from lens.
f = equivalent focus.
m = size of object.
n = size of image.

Fig. 3 shows the same positions of a and b as in fig. 2, but in addition the sizes of image n for these positions.

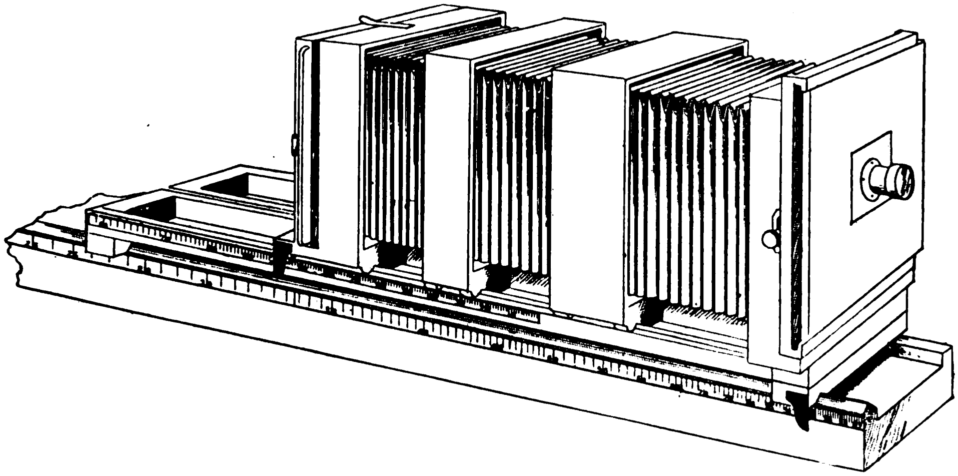
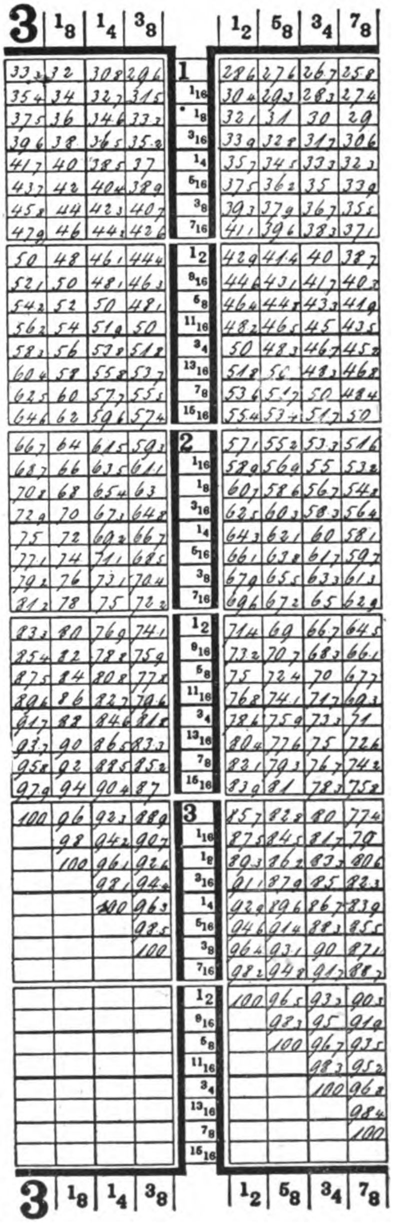


FIG. 4.—Showing a focussing scale attached to a camera.

In order to fill the space between 1–1, $\frac{1}{2}$, 1–3, $\frac{1}{4}$, etc., size, and to arrive at a systematic focussing scale, we have to consider value $\frac{n}{m}$. It expresses the ratio between object and image. By using a uniform denominator = 100, we express this ratio in parts of 100 or per cents. For instance, copy size 10 inch to be reduced to 6 inch becomes a 60 per cent. reduction, copy-size $7\frac{1}{2}$ inch reduced to $4\frac{1}{2}$ inch is also a 60 per cent. reduction, and so forth. My tables have the function of transforming common fractions into percentic values and thus arriving at a systematic base for the focussing scales. These are calculated by means of the above equations and constructed for a presupposed focal length of an imaginary lens of 60 cm. for all ratios at an interval of 1–10 per cent., conforming to the indici of the tables. Fig. 6 is a much reduced reproduction of the focussing chart, fig. 5 a reproduction of page 3 of the tables, showing the general disposition and giving all ratios of reduction for copy-sizes from 3 to $3\frac{7}{8}$ inches.

In order to get the proper working scales for practical work on the camera, it is necessary to reproduce the focussing chart in a manner that one strip of the scales is of a length equal to the equivalent focus of the lens. The equivalent focus of the lens is established by taking two foci, one at natural size and one at $\frac{1}{2}$ or 1–3 or $\frac{1}{4}$ size, as these foci are separated by exactly the length of the equivalent focus. A perfect outfit, a specially constructed focussing screen, a focussing microscope, and some very smart focussing and measuring are required for the work. The scale negative is finely printed on metal, the scales are sawed apart, finished and attached to the camera in proper position and rotation. A specially designed scale adapter makes the work of adjusting the scales to any camera perfectly automatic, thus elimina-

3



3	1/8	1/4	3/8		1/2	5/8	3/4	7/8
33.3	32	30.8	29.6	1	28.6	27.6	26.7	25.8
35.4	34	32.7	31.5	1/16	30.4	29.3	28.3	27.4
37.5	36	34.6	33.3	1/8	32.1	31	30	29
39.6	38	36.5	35.2	3/16	33.9	32.8	31.7	30.6
41.7	40	38.5	37	1/4	35.7	34.5	33.3	32.3
43.7	42	40.4	38.9	5/16	37.5	36.2	35	33.9
45.8	44	42.3	40.7	3/8	39.3	37.9	36.7	35.5
47.9	46	44.2	42.6	7/16	41.1	39.6	38.3	37.1
50	48	46.1	44.4	1/2	42.9	41.4	40	38.7
52.1	50	48.1	46.3	9/16	44.6	43.1	41.7	40.3
54.2	52	50	48.1	5/8	46.4	44.8	43.3	41.9
56.2	54	51.9	50	11/16	48.2	46.5	45	43.5
58.3	56	53.8	51.8	3/4	50	48.3	46.7	45.2
60.4	58	55.8	53.7	13/16	51.8	50	48.3	46.8
62.5	60	57.7	55.5	7/8	53.6	51.7	50	48.4
64.6	62	59.6	57.4	15/16	55.4	53.4	51.7	50
66.7	64	61.5	59.3	2	57.1	55.2	53.3	51.6
68.7	66	63.5	61.1	1/16	58.9	56.9	55	53.2
70.8	68	65.4	63	1/8	60.7	58.6	56.7	54.8
72.9	70	67.3	64.8	3/16	62.5	60.3	58.3	56.4
75	72	69.2	66.7	1/4	64.3	62.1	60	58.1
77.1	74	71.1	68.5	5/16	66.1	63.8	61.7	59.7
79.2	76	73.1	70.4	3/8	67.9	65.5	63.3	61.3
81.2	78	75	72.2	7/16	69.6	67.2	65	62.9
83.3	80	76.9	74.1	1/2	71.4	69	66.7	64.5
85.4	82	78.8	75.9	9/16	73.2	70.7	68.3	66.1
87.5	84	80.8	77.8	5/8	75	72.4	70	67.7
89.6	86	82.7	79.6	11/16	76.8	74.1	71.7	69.3
91.7	88	84.6	81.5	3/4	78.6	75.9	73.3	71
93.7	90	86.5	83.3	13/16	80.4	77.6	75	72.6
95.8	92	88.5	85.2	7/8	82.1	79.3	76.7	74.2
97.9	94	90.4	87	15/16	83.9	81	78.3	75.8
100	96	92.3	88.9	3	85.7	82.8	80	77.4
	98	94.2	90.7	1/16	87.5	84.5	81.7	79
	100	96.1	92.6	1/8	89.3	86.2	83.3	80.6
		98.1	94.4	3/16	91.1	87.9	85	82.3
		100	96.3	1/4	92.9	89.6	86.7	83.9
			98.5	5/16	94.6	91.4	88.3	85.5
			100	3/8	96.4	93.1	90	87.1
				7/16	98.2	94.8	91.7	88.7
				1/2	100	96.5	93.3	90.3
				9/16		98.3	95	91.9
				5/8		100	96.7	93.5
				11/16			98.3	95.2
				3/4			100	96.8
				13/16				98.4
				7/8				100
				15/16				
3	1/8	1/4	3/8		1/2	5/8	3/4	7/8

FIG. 5.—Table showing all ratios of reduction from 3 to $3\frac{7}{8}$ inches.

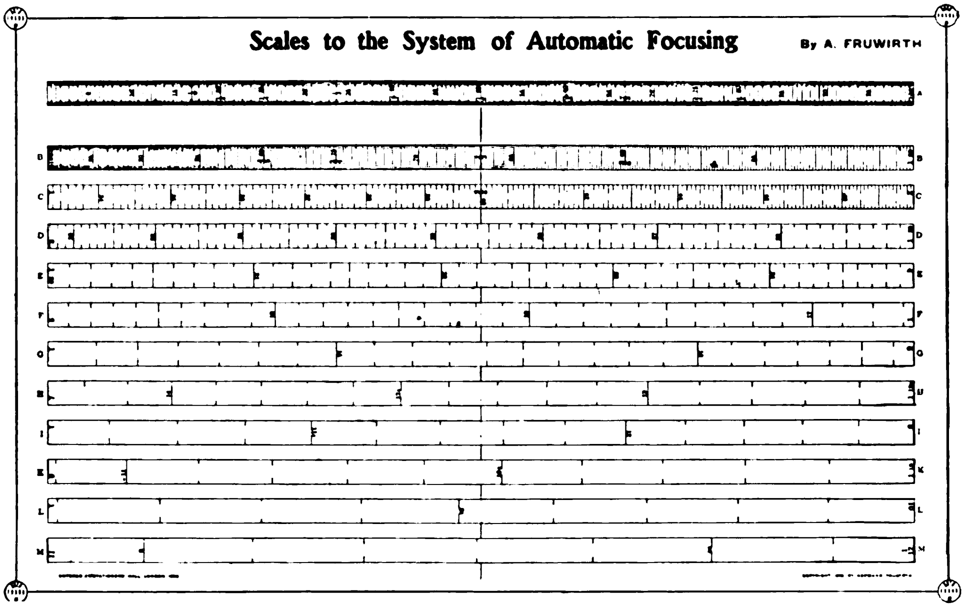

Scales to the System of Automatic Focusing By A. FRUWIRTH

FIG. 6.

ting the chances of faulty attachment. Two indicators for the positions of the camera and of the sensitive plate finish the installation of automatic focussing. The percentic ratio indici are looked up in the tables, and on these indici of the scales camera and ground-glass are set—an operation of a few seconds.

Enlargements require neither extra tables nor a specially calculated focussing scale. A second set of the scales is prepared from the chart negative and attached to the camera in reversed order of the reduction scales, while the ratios of enlargement are read from the tables exactly like reductions with copy and negative size interchanging places. An example will clear the maker: 3 inch enlarged to 4 inches becomes 4 inches reduced to 3 inches, or ratio 75 per cent. of the enlarging scale.

All matters of proportion between height and width of copies, grouping of several copies in a given space, combination and insertion jobs are settled by the tables without ever going back to the ground-glass. Sizes and definition of negatives are perfect; no copy will escape which can be bunched with another one. Objects of considerable thickness, like books, paintings, are scale-focussed with the same ease. In eight out of ten cases even real objects need no ground-glass.

With an average output of 100 half-tone negatives a week and four to five minutes to the exposure the arc lamps burn no longer than six to eight hours from Monday till Saturday. Linework with exposures from one-half to one minute, even if the output of negatives be trebled, is all exposed in one half hour per day.

("The Process Photogram.") December 1909

Orientation of the Screen in Color-Printing.

By L. Villemaire.

Translated from *Le Procédé.*

NOTWITHSTANDING the many articles published on this subject we still so often notice colored printings injured by moiré that it should not be useless to briefly sum up the facts already known with the addition of some personal observations.

I will only recall to memory printings in two colors for which the deepest tint is screened at 45° – 45° on both sides of the vertical, like the usual work in black, and the highest light with an inclination of the screen such as the new directions make from the angles of 30° with the directions of the first screen, should then be obtained; for example, by using a color screen ruled at 15° and 75° on both sides of the vertical.

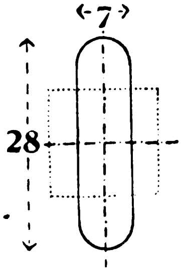


FIG. 1.

Several methods have been adopted for three-color printing, for reproductions intended for quick printing on rotary machines on cheap paper, work usually done for a number of popular journals with a screen of 40 lines to the centimetre or 100 to the inch. I always use for the yellow negative a screen ruled parallel to its sides but eliminating some of the horizontal lines by a diaphragm whose almost rectangular opening (fig. 1) has its greatest length placed vertically.*

For the red negative it is, on the contrary, the vertical lines which will be eliminated by using a greatly elongated oval diaphragm (fig. 2) whose greatest axis will be placed horizontally.

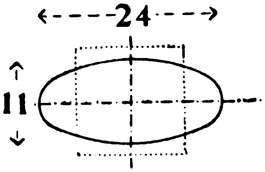


FIG. 2.

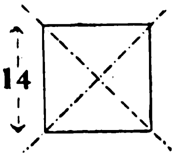


FIG. 3.

Finally, the blue negative is made with the ordinary screen at 45°, using the square diaphragm (fig. 3) usually employed in black work.

In default of a pair of screens, of a circular screen, or a rotary screen-carrier, we can easily use an ordinary screen and turn the original obliquely for the first two negatives, watching to make the squaring parallel to the lines of the screen, then bring back the copy to the perpendicular for the third negative.

The orientations most commonly used in three-color printing with a fine screen are those obtained by using a pair of screens placed on both sides of the vertical 45° – 45° for the blue, 75° – 15° for the red, and 15° – 75° for the yellow. With the respective inclinations of 30° for the three screens we can vary at will the formation of the dot arrangement by the use of different diaphragms. We can, for example, use square diaphragms for the three monochromes or reserve the square diaphragm for printing the yellow,

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* The openings represented by the lines 1 to 3 are in those corresponding to the use of a Cooke Process lens No. 5 (30 x 40) of 460 mm. (17½ inches) of focal length, and screens of 40 lines to the centimetre (100 to the inch); the surfaces of these openings are practically equal to that of the square opening No. 6 of the normal series for black.

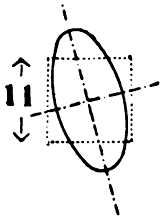

FIG. 4.

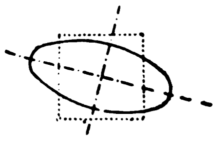

FIG. 5.

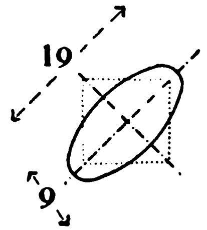

FIG. 6.

and choose elongated ones for the red and blue; or, finally, elongate the diaphragm following a leading direction for each of the three negatives, watching then that these three leading directions form between them successive angles of 60°, and using for that purpose diaphragms oriented as indicated respectively for the yellow, red, and blue, the figures 4, 5, and 6.*

With the Schultze - 60° screen and elongated diaphragms these will be brought successively to have their great axis following the three directions which these screens should take: for example, horizontal for the yellow, then 60° for the blue, and 120° for the red.

Knowing that in three-color printing the division of the right angle into three equal parts with successive inclinations of 30° gives the best results, we ought to understand that for the process in four colors it will suffice to divide the right angle into four equal parts and give consequently successive inclinations of 22½° to the four screens; but a single trial is enough to prove that these inclinations are absolutely inadmissible, the moiré appearing in all its horror at the time of the polychrome printing. We easily see that while no moiré appears when the yellow printing cuts the other monochromes at 15° there is needed at least an angle of 27½° between the three other monochromes. Under these conditions the best results are obtained by making the yellow negative with screens having horizontal and vertical lines and square diaphragm, while for the three other colors we adopt the inclinations of screens ordinarily used in three-color work with predominance of one of the lines over each of the three screens by employing elongated diaphragms should be respectively for the blue, red and black the diaphragms represented by the figures 4, 5 and 6. We can again use for the black, red, and blue a screen of 70 lines to the centimetre (175 to the inch), the three screens being turned to the same inclinations as previously, but with square diaphragms, while the yellow monochrome would be printed with a screen of 53 lines to the centimetre (133 to the inch), with the horizontal line predominating by using an oval diaphragm placed horizontally as in fig. 2.

It is by no means necessary for halftone in four colors to make use of a circular screen mounted on a rotary screen-carrier: the pair of screens for three colors are amply sufficient, since, with the exception of a yellow monochrome, the inclinations are the same, and it suffices in default of a screen ruled parallel to the sides to incline the original on the copy-board until the desired orientation is obtained. To bring the frame of the subject parallel with the ruling we must turn the model on itself at 15°. We can thus easily register a 24 x 30 in a 30 x 40 screen, while we could scarcely register an 18 x 24 by using the normal screen at 45°.

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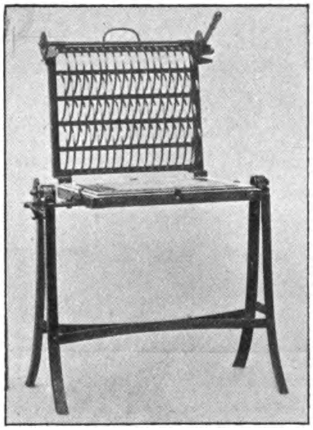
* The openings represented by figs. 4 to 6 are in actual size and shape as in use with a Cooke Process lens No. 5 and screens of 60 lines to the centimetre; the surfaces of these openings are practically equal to that of the square opening No. 7 of the normal series for black. For a negative on wet collodion from a positive reproduced the same size the diaphragm should be greater by 1 millimetre relatively to that indicated in our preceding diaphragm, which should be carried to 9 millimetres.

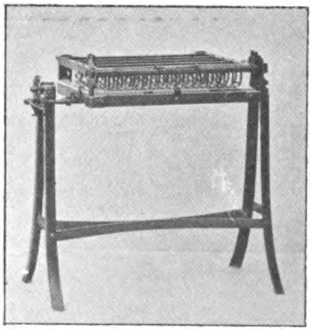
We should also be able to use two distinct diaphragms for the exposure of lights and shadows by constituting in each of the color-exposures a series of diaphragms having respectively the same surface of the openings as the square diaphragms in the normal series.

Printing in four colors is, in my opinion, the only process which allows printing in rapid succession of different monochromes on the printing machine without loss of time in drying the colors. The result is superior to that given by three-color prints, in the sense that pure black is obtained in color printing only by superposing the three colors flat on each other, which mixes them in place of superposing, while with a black key we have only a single impression, since the plates of the three monochromes are previously routed or etched out in all the positions corresponding to a pure black.

Another process which is sometimes confounded with the preceding under the same name of four-color printing is only the ordinary three-color process with local substitution of a printing in a fourth color of the image furnished by the three monochromes, this fourth color most usually being green. The same inclinations are then often used as for three-color printing properly, so called, and for the fourth color the inclination is the same as for one of the three primary colors, with this exception, that the corresponding plate is bitten until large hollows are obtained in all portions where the fourth color should show.

THE DRACO PRINTING-FRAME is illustrated by the little cuts herewith. It has a multiple-spring pressure, given by a great number of steel strip springs. Its back is opened instantly, by one simple thumb-catch, and is similarly easily closed, and the frame swings on trunnions from the horizontal position in which it is filled with negatives and metal, to the vertical position for printing.





√ *Dr. Albert's Improved Process for Producing Printing Plates for Letterpress or Lithographic Printing.*

LAST month (pp. 257–259) we gave the patent particulars of the resist used in Dr. Albert's new process. The patent abstracted below deals mainly with the revolutionary method whereby the half-tone screen negative is rendered unnecessary. It gives "half-tone blocks without a half-tone negative," and "copper quality without copper," to quote the claim of Dr. Albert himself, which seems to be fully substantiated.

ECONOMY OF TIME, MONEY, AND SPACE is secured, and the importance of the new process is undoubtedly very great indeed. In our next issue we shall give further particulars, illustrated with striking comparison examples, and the process bids fair to be "in all men's mouths" in the photo-engraving world for some time to come.*

Dr. Albert claims an improved process for making half-tone blocks, and improvements in apparatus for carrying out the process.

The objects are to produce printing plates having the tones more nearly like those of the original than have heretofore been obtained.

Such blocks are printed through a screen, as is well known, which has the effect of forming small dots over their surface; in order to obtain the breaking-up of the light values of a half-tone negative into points and lines of suitable dimensions, it has hitherto been proposed that during, prior to, or after the copying of the negative, the screen should not bear directly upon the sensitive layer, and that the angle of incidence of the light should be changed. In this connection it is to be remarked that the rays of light in themselves, due to the smallness of the screen apertures and to the slight distance of these from the sensitive layer in proportion to the great distance of the source of light, are regarded as parallel.

In the usual process for obtaining a change of the angle of incidence of the light on a cross screen as set forth above, the axis of the angular alteration of the plane of the screen had to form an angle with the line systems, or else be parallel to one of the systems.

As each individual transparent point of a cross screen acts like a camera obscura, it will be clear that in the latter case in the single act of copying, a line is formed which shows the greatest copying intensity towards the central point whilst at the ends the light impression is smaller; whilst on the second exposure effected after turning the screen through an angle of 90° about an axis perpendicular to its surface a second line under analogous conditions, perpendicular to the first line, is formed, so that a cross is formed as the product of the copying process.

Apart from secondary processes no enlargement of angle can alter the result obtained, viz. that the two cross bars have always the same width at the points both of maximum and minimum intensity.

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* We frankly admit that the patent is extremely difficult to understand. At times it is difficult to know whether it refers to existing half-tone methods or to Dr. Albert's previous patents, and it assumes, or takes for granted, a great deal of knowledge that is not in the possession of the half-tone worker. It seems desirable, however, to give it, practically unabridged, as a basis for explanatory notes and articles which will follow, and which are justified by the extreme importance of the new principles and methods.

This cruciform fashioning of the screen point in the copy is very objectionable, as on account of the aforesaid lack of dissemination, small light points can never be obtained in the parts of the copy corresponding to the dark parts of the original.

Such a closure of the points can only be obtained by excessively extending the periods of exposure, but in that case the result is affected not only by small solarisation phenomena but also by the reflection from the etched glass walls of the screen lines, also by the rays of light dispersed laterally by the bromide of silver molecules, and by similar non-controllable secondary matters.

Circumstances are still more unfavorable if the axis for the angular alteration of the plane of the screen be not parallel to the sides of the square of the screen but is diagonal thereto, as in that case, apart from secondary matters, no points will be formed at all but only white lines. A correct point form with concentrically increasing light intensities, and which is also capable of properly reproducing the light values of a negative or positive, cannot be obtained at all with cross screens by angular alterations of the plane about an axis diagonal to the square of the screen; but according to this present process, by reason of the arrangement that the projection of the transparencies of the cross screen upon the sensitive coating is effected by rays of light falling on the sensitive surface in angles of varying direction in such a way that the action of the central rays and those immediately adjacent thereto is diminished, a much better distribution of the light is obtained; further, the curve of intensity is all the softer, and the result is all the richer in tone the smaller the angle of incidence and the more different directions there are.

In practice very good results have been given by the arrangement that the central point of the projection describes an annular path, the maximum diameter of which is preferably not larger than one side of the projected screen-transparency; and, if the annular path forms a circle, then allowance must be made for one and the same equal degree of angle and an infinite number of directions.

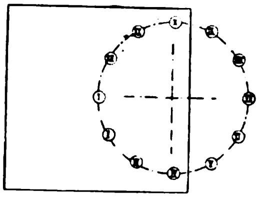


Fig 1

Figs. 1–3 of the accompanying drawings will serve to explain the process diagrammatically.

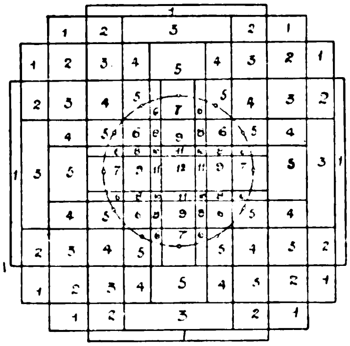


Fig 2

In fig. 1 the square shows the projection of a screen aperture, and the circle the ring in which the central point of the projection is to move. In order to give a bird's-eye view of the matter only twelve points, I. to XII., are given in the ring, and by the successive displacement of the central point of the square to each of these twelve points there is produced the projections shown in fig. 2, in which the copying intensities are given by means of figures. From these figures there is obtained the form of the decline of the intensity curve; and as regards the shape of the dot it is clear that the corners on the outer sides will disappear by increasing the number of the points of displacement; by continued operation there is obtained the form shown by dotted lines in fig. 3, at four adjacent screen points. If the annular path is exactly a circle, then round-shaped screen points are formed; but if, on the contrary, it is somewhat lengthened, then the so-called egg shape or oval bar shape is obtained.

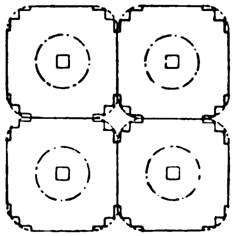


Fig 3

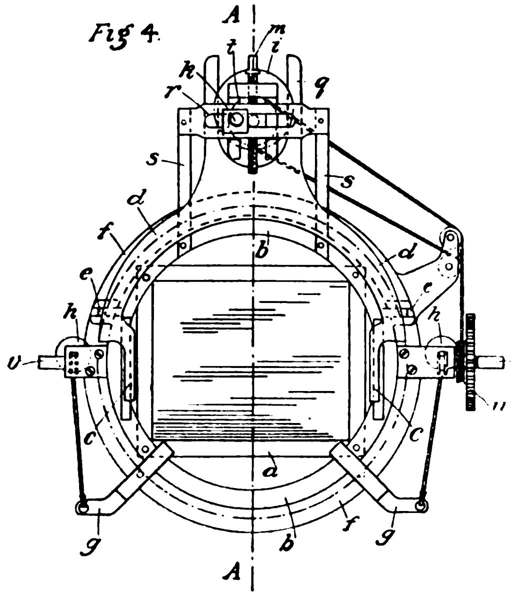


Fig 4.

The means for compelling the screen point projection to follow such annular paths are of course numerous.

One of the simplest will always be to move the copying-frame itself in such an annular path.

The accompanying drawings show a preferred form of my invention for doing this.

The new device consists essentially in the fact that a frame carrying the copying-frame is mounted movably in a straight guide of a second frame which moves in a slide placed at an angle of 90° to the first slide, the arrangement being such that by the aid of eccentrics or lever rods the two straight movements at a right angle to each other are changed to an annular (circular or elliptical) movement by a suitable operation of the adjustable eccentrics or their equivalents.

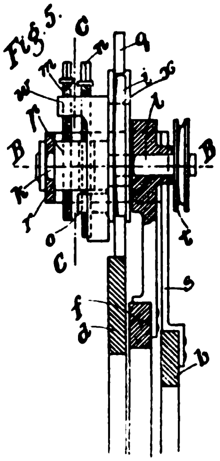
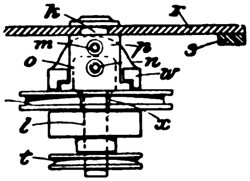


Fig 5.

Now in the drawing the rotatably mounted part of such an apparatus, which is the part of chief importance, is shown in fig. 4 in plan on the side which is turned towards the source of light; in fig. 5 in section corresponding to the line A-A; in fig. 6 in section along the line B-B;

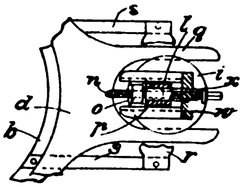
and in fig. 7 in a section corresponding to the line C–C. The method of driving the apparatus through the spur wheel *u*, and also the device for tilting the whole system, are not shown as they may be accomplished by any suitable means in common use, it being explained that the apparatus is carried by trunnions *v* to allow of tilting, so that it may be brought into various degrees of obliquity with respect to the source of light.

Fig. 6.



a is the copying frame carrying the screen and the film to be exposed along with the negative, and in its turn the frame *a* is carried by the frame *b*. This frame *b* is mounted to slide in the slides *c* of a second semi-circular frame *d* in such a way that it can be moved upwards and downwards. The frame *d* itself, on the contrary, is so arranged, by the aid of slides *e*, upon a fixed frame *f*, that it can be moved sideways only. The arms *g* attached to the frame *f* for the cords leading to the weights *h*, or it may be chains or the like, are formed at the same time to act as guide forks for the movable frame *b*. The weights *h*, which can also be replaced by springs, are intended to keep the frame *b* in equipoise in the sloping or other position requisite for exposure in order to relieve the eccentric *k*. The movement of the two frames *b* and *d* is effected in this case by means of eccentrics *i* and *k*, which are adjustably connected with the driving shaft *l*. The displacement of the eccentrics is effected by the aid of screw spindles *m* and *n*, which are mounted in the part *w* firmly attached to the shaft *l*. Of these screw spindles the spindle *n* has its female thread in a lug *o* mounted on the eccentric *i*, whilst the second spindle *m* engages with the slide *p* carrying the eccentric *k*. The eccentric *i* must of course be provided with a slot *x* in order to accommodate the shaft *l* in any position of the eccentric. As may be seen from fig. 5, the screw spindle *n* for the slide *o* passes through a sufficiently wide opening or hole on the slide *p*. The slides can also be provided with scales which permit of an exact adjustment of the throw of the eccentrics to give the desired diameters of the ellipses or circles respectively.

Fig. 7.



The eccentric *i* engages with a fork-shaped prolongation *q* of the frame *d*, and moves the latter laterally to and fro on operating the eccentric shaft *l*, whilst the second eccentric *k* moves in a slotted guide *r*, which is rigidly connected with the frame *b* by means of rods *s*. By a suitable adjustment of the eccentrics in relation to each other, and by the operation of the eccentric shaft *l* through the cord pulley *t*, according to the adjustment of the lift of each individual eccentric, a circular or elliptical movement of the whole system is secured.

Instead of moving the copying frame by the aid of the device described, the device could instead be used for moving the source of light in a similar manner in relation to a fixed copying frame.

The Rise and Progress of Lithography.

A special lecture on "Ancient and Modern Lithography" was delivered to the printing trade on Wednesday, Nov. 3, at the Leicester School of Art, by Mr. Joseph Goodman. Quite a record gathering attended, the large lecture hall being filled to overflowing.

There was also quite a large sprinkling of employers there, who took the keenest interest in the proceedings.

Mr. W. H. Lead took the chair, supported by Messrs. Shardlow, Lawrence (*British Printer*), Widdowson, Adams, Wells, Fletcher, C. Parkinson, and others.

There was a large display of all kinds of lithographic printing, which covered the whole gamut of the trade. Great admiration was expressed for this splendid display of lithographic work, which was pronounced to be the most complete and extensive that had ever been seen in Leicester.

Many examples of fine chalk work and in color hung adjacent to the modern examples of latter day photochrome work; also examples of American, British and Continental work in poster display, showcard, and colored plate printing; hand work as well as machine work of every type.

The lecture was fully illustrated with about sixty slides of more than passing interest.

The Principal of the School of Art had also arranged in the lobbies of the school a display of studies used for the training of lithographic artists, etc.

The lecturer traced lithography's humble origin, rise and progress, through the portions of three different centuries, and explained in brief detail the technique by which the various triumphs and successes had been scored. Outlines of the different processes, and the principles underlying them, were given, diagrams of the machinery being also described.

Special stress was laid upon the great opportunities opened out to the trade, by the rubber offset lithographic rotary and metalithography, combined with photo-process work. The "Harris" machines were shown, as were also those of Geo. Mann & Co. of Leeds, and Bentley-Jackson's "Rubel."

The triumph already scored by these machines now working in England was referred to, and examples of the work done by them were displayed and universally admired.

The opportunities opened out by these machines for erecting entirely new channels of work were fully enlarged upon and intently followed by the audience.

A slide display of the new rotary stone cylinders for lithographic printing formed the finishing part of the lecture.

Collotype and Photo-litho.

The Offset Press and its important bearing upon photo-engraving, letterpress, and lithographic printing, will be the subject of notes in our next issue, in continuation of those on pp. 241-242 last month.

"Collotype ahead in Europe" is the head-line used by *The Engraver and Electrotyper* to emphasise the fact that America does not use collotype so much as seems desirable. Nor does Britain. The magnificent color-collotypes which we commented upon in the Dresden exhibition are selling in London printsellers' shops at prices quoted in guineas per print, and we have no home products to attempt to compete with them.

The Photo-Guillocher Machine, which is patented and used by the company of the same name, of Zurich, is employed for the production of elaborate cheque patterns for the prevention of forgery in important money documents. An intricate basic figure is drawn by means of a ruling machine, and this is then copied a number of times, either in juxtaposition or superposition, or both, with the result that designs which it is impossible to copy by mechanical means are made very easily.

Litho and Letterpress.—*The American Printer* says:—"In the lithographic business the process of its growth has steadily tended to bring its work closer and closer to the type printer, and to a steadily increasing extent to amalgamate permanently the two interests once considered inimical. Indeed, the advantages of lithography are so frankly admitted by the printer that, in many cases, he is himself a lithographer as well; and his customers may choose between the processes, ordering either or both from the same establishment. The effects secured by lithography are distinctly individual, and where many colors are used the advantages on certain classes of production are obvious.

A Speed Record on the Offset Press.—To the Manhattan Bank-Note Company, of New York, belongs the credit of breaking all records in getting out rush work on an offset press. On a Saturday, a man came in with an order for 8400 folding post cards, each size 6 x 17 inches, in four colors and with four changes. Although late in the day when the order came in, the job was promised on Monday. Incredible as it may seem, the transfers were made, the card was secured, and the entire job finished and delivered by Monday at noon. The cards were printed 4-on, making 84,000 impressions. The total working time from the taking in of the job to shipping the finished product was eighteen hours. Two offset presses were used.—*The National Lithographer.*

To Transfer for the Offset Press.—Have a clean basin, clean sponges, and clean water. Have good, sharp black impressions. Use slightly more pressure than for stone. Dust the plate off with a clean piece of cheese-cloth. The plate may be dampened with water if necessary. But damp transfer paper is preferable. Pull through press sufficiently to transfer work; soak off paper and be careful to remove all surplus starch, etc., with clean water; then fan dry and touch up where necessary with tusche or lead pencil. After the plate has been touched up, gum it up with gum about the consistency of syrup and rub up before the gum is allowed to dry on the plate, using a good black ink reduced with thin varnish and turpentine for the purpose (the plate may not rub up solid, but will roll up solid). When sufficiently rubbed up, wash off the surplus gum and ink with clean water, gum up and rub smooth and fan dry, and wash out with No. 3 washout solution on the dry gum. Rub this smooth and fan dry, after which wash the plate off with clean water and proceed to roll up, using a good black ink reduced with 00 varnish. When sufficiently rolled up, powder with rosin and French chalk, and proceed to clean out dirt spots, etc., by using either a pointed piece of wood and pumice powder, or snake slip for the purpose. The plate is then gummed up and fanned dry, washed out with the No. 3 solution, and is ready for the steam press.—*The Printing Trade News.*

School Notes.

The Bolt Court School will be housed in New Court and Fleet Street during the building of new premises on its present site.

The Bolt Court Lectures for the month are:—December 2nd, Fred O. Penberthy, Esq. (Managing Director of Halftones, Ltd.), "Press Photography"; 9th, A. C. Middleton, Esq., "Early Experiences of Process Work"; 16th, A. J. Newton, "The Usual Methods of Reproducing Illustrations."

Presentation to Bolt Court.—Bolt Court School has recently been presented with three whole-plate metzograph screens by Mr. James Wheeler; twelve India proofs of wood engraving by the Brothers Dalziel of the work of different famous artists of the sixties, by Mr. Chas. Dalziel; twenty-two same size reproductions of various drawings, etchings and engravings of Albrecht Dürer, by Mr. Montague Peartree, and also the block by Mr. Arthur Payne, being the first direct portrait on metal; also a sample of line etching copper resist new Payne-type direct process.

Business.

The M'Kenzie Engraving Company, Boston, Mass., has absorbed the business of F. W. Nickerson & Co.

The Jahn & Ollier Company, Chicago, has opened a business office in the Good Building, Des Moines, Iowa.

Springfield, O., is to have a new process house under Benjamin Kelly, from the Springfield Engraving Company.

The Capitol Engraving Company, Nashville, Tenn., has been started by James O'Connell and George Maloney, from the Nashville Photo-Engraving Company.

The serious trade depression of a couple of years ago is said to have made no difference to the returns and profits to the Manz Engraving Company, Chicago.

The Manhattan Photo-engraving Company, William Street, New York, has a new managing director in Lyman C. Hershey, who has just bought a controlling interest.

The Strand Engraving Company, Ltd., has removed into a magnificent new building in Martlett's Court, Bow Street, London, W.C., facing the Covent Garden Opera House, and conveniently mid-way between the Eastern newspaper and book-publishing world and the new book-publishing district of the West. It is amidst the offices of the principal illustrated weeklies.

John Swain & Sons, Ltd., are fully installed in their very fine new building at the junction of Shoe Lane, St. Bride Street, Stonecutter Street, Farringdon Avenue, St. Andrews Street and Little New Street. It is a busy corner, with some of the greatest printers and newspapers in the country "next door." A half-mile radius would probably cover half the illustration-buyers in London; and perhaps a quarter of those in the whole country. The new building is only a few hundred yards from the old premises in Farringdon Street, and it is not only much more spacious but also far more convenient, because the whole of the details have been planned with the best experience in the trade, instead of being the result of gradual growth.

Brevities.

The photogravure capacity of the Barnes-Crosby Company of Chicago is said to be over 20,000 prints per day, without working overtime. This department occupies over 6000 square feet of floor.

"Advertising and Promotion" is the title of a new department in the Barnes-Crosby business, which has factories in Chicago and St. Louis, and branches in fifteen other cities. The new department is under Mr. Louis Flader.

Paynetype has suffered, as many another valuable invention has done, from the fact that its first examples were not made by experts in the work to which it is to be applied. A result of this is that some of those people who judge first experiments as if they were final achievements have suggested that "the results are not good enough." This month we are enabled to give a half-tone and a line print which, while still the work of an amateur, are good enough to show that the process of working direct upon the metal plate (sensitised) in the camera is perfectly satisfactory, so far as the resulting block is concerned. There seems to be no direction in which the results need be inferior, while in certain respects they should be better than those secured by the interposition of a negative. The saving of time and of material will be important when the process is fairly in use.

The Editor of this Journal will visit the United States and Canada during January, February, and March of 1910 in the interests of *The Process Monthly* and the other publications with which he is connected. He hopes to reach the principal cities in the area lying between Boston, Toronto, Detroit, and Milwaukee on the north; St. Louis, Louisville, and Washington on the South, and will endeavor to call upon any "process" men who may care to meet him, and who will write to that effect. All American communications for *this* magazine, and anything absolutely needing the personal attention of the Editor, should be addressed to H. Snowden Ward, 122 East 25th Street, New York, during January–March.

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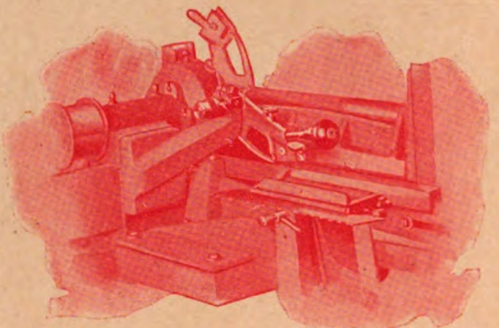

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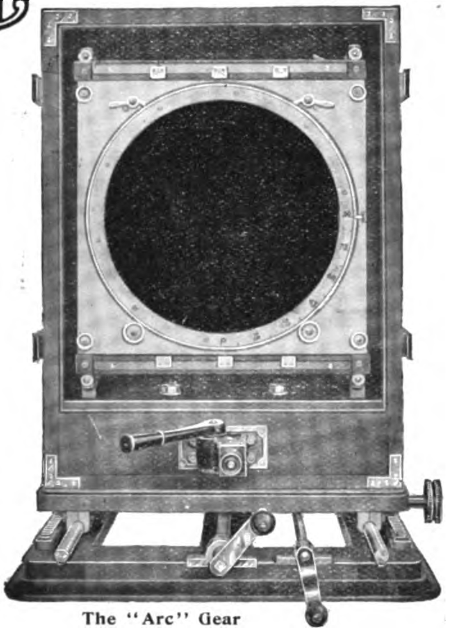

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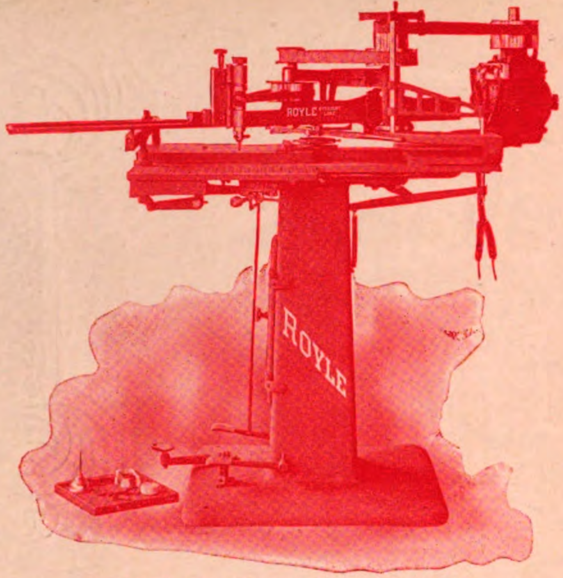

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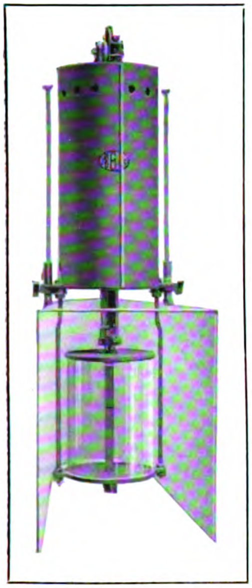

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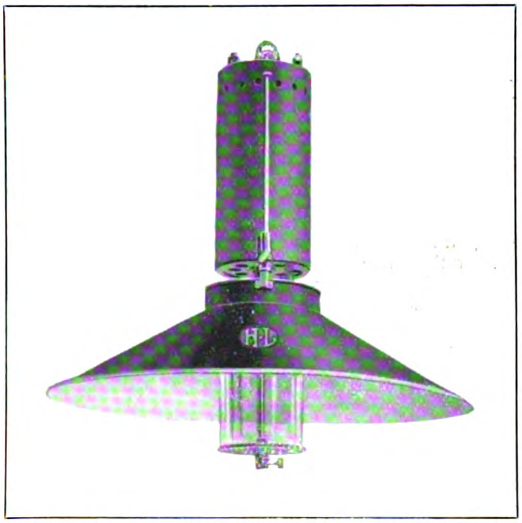

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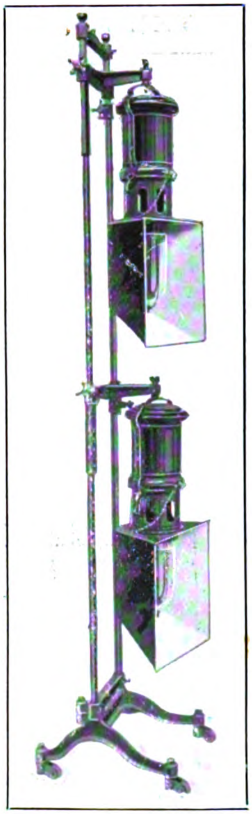

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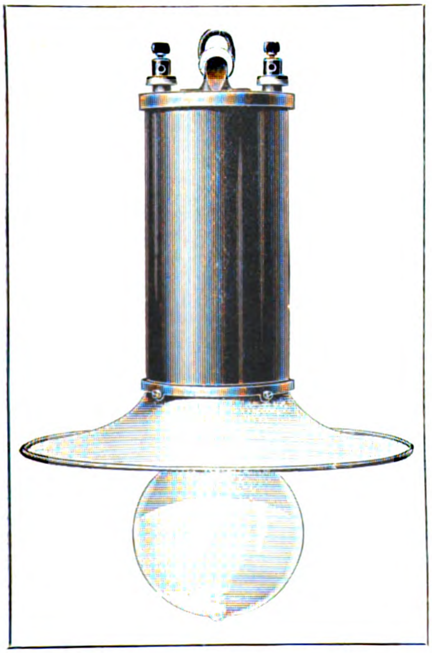

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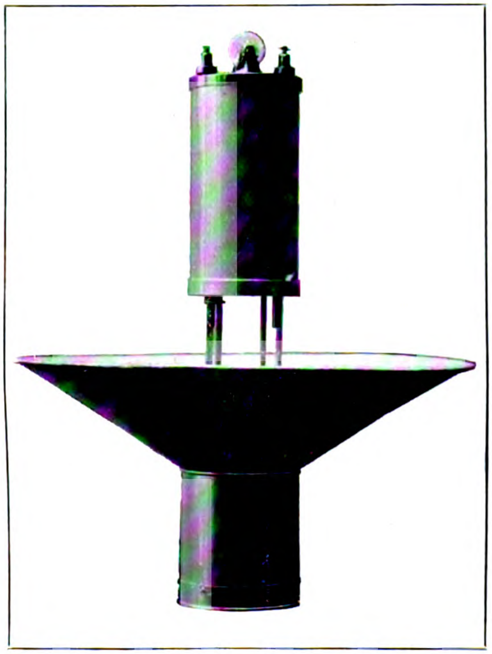

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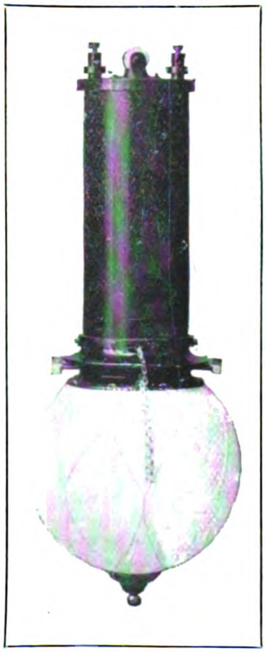

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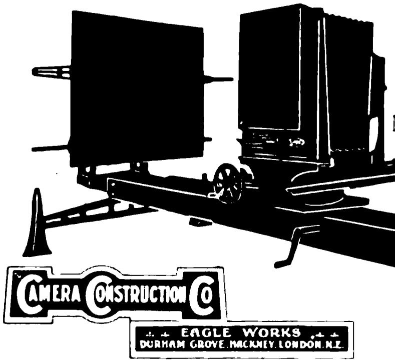

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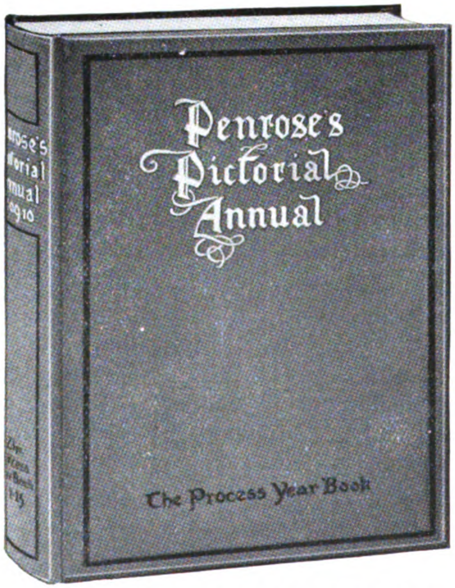

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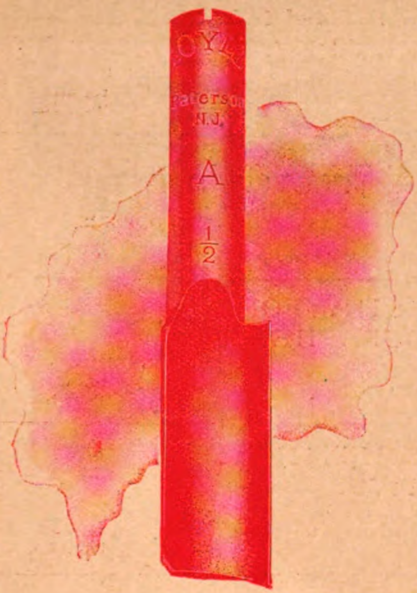

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